HANDBOOK

OF

THE UNIVERSITY OF BOMBAY
(PART II)

1939

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BOMBAY

PRINTED AT THE COMMERCIAL PRINTING PRESS

1939

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Reference to Statutes, Ordinances and Regulations.*

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THE ACT*

(Act IV of 1928 as amended to date)

An Act to amend the law relating to the University of Bombay.

VIII of 1904.

WHEREAS by Act XXII of 1857 a University was established and incorporated at Bombay;

And whereas the law relating to the said University was amended by the Indian Universities Act, 1904;

And whereas it is necessary to reconstitute the said University to enable it to provide greater facilities for higher education and to conduct post-graduate teaching and research in all branches of learning, including technology, while continuing to exercise due control over the teaching given by colleges affiliated to it from time to time; And whereas the previous sanction of the Governor-General required by section 80A (3) and the previous sanction of the Governor required by section 80C of the Government of India Act have been obtained for the passing of this Act; It is hereby enacted as follows:—

CHAPTER I .- PRELIMINARY.

- 1. This Act may be called the Bombay University Act, Short title. 1928.
- 2. This section and sections 1 and 44 shall come into operation at once. The rest of the Act shall come into operation on such date † as Government may, by notification in the Bombay Government Gazette, appoint in this behalf.

*First published, after having received the assent of the Governor General, in the Bombay Government Gazette on the 2nd August, 1928.

* Bombay Castle, 11th April 1938.

No. 6256.—The following notification by the Government of India, Department of Education, Health and Lands, is republished:—

EDUCATION

No. F.-55-1 (ii) /38-E, dated New Delhi, the 7th April 1938.

In exercise of the powers conferred by sub-section (1) of section 124 of the Government of India Act, 1935, the Central Government is pleased, with effect from the 1st April, 1938, to entrust to the Provincial Government of Bombay, with their consent, the functions of the Central Government under sub-section (2) of section 12, section 17. sub-section (3) of section 32, sub-sections (3) and (4) of section 39, section 40 and sub-section (5) of section 42 of the Bombay University Act, 1928 (Bombay Act IV of 1928), subject to the condition that as regards functions under sub-sections (3) and (4) of section 39, section 40 and sub-section (5) of section 42, aforementioned, the Provincial Government of Bombay shall not pass orders save with the concurrence of the Government of the province, wherein the college concerned is situated, and provided that in the event of disagreement between the two Governments, the matter shall be referred to the Central Government for orders.

(Signed) G. S. BAJPAI,
Secretary to the Government of India.
By order of the Governor of Bombay,
H. T. SORLEY,

Secretary to Government.

†Government by its notification, dated the 23rd January, 1929, appointed the 24th January, 1929, as the date on which ss. 3 to 43 and 45 to 52 of the Act would come into operation.

5 & 6 Geo. V.

2

ACT

VIII of 1904.

- 3. In this Act, unless there is anything repugnant in the Interpretation. subject or context—
 - (a) "College" means an affiliated college;
 - (b) "Fellow" means an ex-officio Fellow or an Ordinary Fellow of the University appointed under the provisions of this Act but does not include an Honorary Fellow;
 - (c) "Head Master" means the head of a High School registered by the University;
 - (d) "Prescribed" means prescribed by the Act or by any Statutes, Ordinances or Regulations made thereunder;
 - (e) "Principal" means the head of a college;
 - (f) "Registered Graduate" means a graduate registered under the provisions of this Act or of the Indian Universities Act, 1904;
 - (g) "Statutes", "Ordinances" and "Regulations" mean respectively the Statutes, Ordinances and Regulations of the University made or deemed to have been made under this Act and for the time being in force;
 - (h) "Teacher" means such Professor, Reader, Lecturer and person giving instruction in any college as may be declared by the Statutes to be a teacher;
 - (i) "University" means the University of Bombay as reconstituted under this Act;
 - (j) "University Department" means any collegiate institution or post-graduate or research department maintained by the University;
 - (k) "University Professor" means a person appointed as such by the University; and
 - (1) "University Teacher" means a person appointed by the University to give instruction on its behalf.

CHAPTER II.—THE UNIVERSITY.

- 4. (1) The University shall be and shall be deemed to have been incorporated for the purpose (among others) Incorporation and of making provision for the instruction of powers of the Unistudents, with power to appoint University Proversity. fessors and University Teachers, to hold and manage educational endowments, to erect, equip and maintain University laboratories and museums, to make regulations relating to the residence and conduct of students, to lay down courses of instruction for the various examinations, to guide the teaching in colleges, to inspect colleges and to take measures to ensure that proper standards of teaching are maintained in them, to hold examinations, to confer degrees, to undertake post-graduate teaching and to promote research, and to do all acts, not inconsistent with this Act, which tend to the promotion of study and research.
- (2) The Chancellor, the Vice-Chancellor, the Rector (if any), the Fellows and all persons who may hereafter become or be appointed or elected to be Chancellor, Vice-Chancellor, Rector or

Fellows as hereinafter mentioned, so long as they shall continue to be such Chancellor, Vice-Chancellor, Rector or Fellows, are hereby constituted and declared to be one Body Corporate by the name of the University of Bombay; and such Body Corporate shall, by such name, have perpetual succession and a common seal, and by such name shall sue and be sued.

- (3) The University shall be competent to acquire and hold property, both moveable and immoveable, to lease, sell or otherwise transfer any moveable or immoveable property which may have become vested in, or been acquired by it for the purposes of the University and to contract and do all other things necessary for the purposes of this Act.
- 4A.* The territorial limits within which the powers conferred upon the University by this Act shall be exercised shall comprise the whole of the Bombay Presidency (excluding Aden) and such Indian States and other territories† as may, from time to time, be notified in this behalf by the Central‡ Government in the Bombay Government Gazette.
- Inspection of the University, of any institutions associated with the University and of any work conducted or done by the University, and to make an enquiry or to cause an enquiry to be made in like manner in respect of any matter connected with the University. The Chancellor shall in every case give notice to the Senate of his intention to make an inspection or enquiry or to cause an inspection or enquiry to be made, and the Senate shall be entitled to be represented thereat.
- (2) The Chancellor may, after such inspection or enquiry, by order in writing, cancel any decision of the University or any authority thereof in respect of any matter which is not in conformity with this Act and the Statutes, Ordinances and Regulations:

Provided that, before making any such order, he shall call upon the Senate to show cause why such an order should not be made, and if any cause is shown within a reasonable time, he shall consider the same.

^{*}This section was inserted by Act XX of 1930 (Territorial Limits Amendment Act.)

^{† &}quot;In exercise of the powers conferred by Section 4-A of the Bombay University Act, 1928 (Bom. IV of 1928), the Government of Bombay is pleased to notify that the Indian Institute of Science, Bangalore, and the Imperial Agricultural Research Institute, New Delhi (provisionally,) shall be included within the territorial jurisdiction of the Bombay University." (Vide Government of Bombay Notifications No. 4732, dated the 21st September, 1932 and No. 4274 dated the 15th October 1937, respectively.)

^{† &}quot;In exercise of the powers conferred by Section 4-A of the Bombay University Act, 1928 (Bombay Act IV of 1928) the Central Government is pleased to extend the territorial limits of the Bombay University to the Imperial Veterinary Research Institute, Mukteswar and Izatnagar" (Vide Government of India, Department of Education, Health and Lands, Notification (Education) No. F. 55-20/38-E, dated the 16th June, 1938).

[†] This was substituted for 'Local', under the Government of India (Adaptation of Indian Laws) Order, 1937, passed on the 18th March, 1937.

Religious and other tests.

Religious and other tests.

Religious and other tests.

Religious and other tests.

Religious and of sex, race, creed or class, and it shall not be lawful for the University to adopt or profession in order to entitle him to be admitted thereto as a teacher or student or to hold any office therein or to graduate thereat or to enjoy or exercise any privileges thereof except where in respect of any particular benefaction accepted by the University such test is made a condition thereof.

- 7. The following shall be the authorities of the University:
 Authorities of the
 University.
 - (1) The Senate,
 - (2) The Faculties,

(3) The Syndicate,

(4) The Academic Council,

(5) The Board of Post-graduate Studies,

(6) Such other bodies as the Senate may declare by Statutes to be authorities of the University.

CHAPTER III.—THE SENATE. ITS POWERS, CONSTITUTION AND DUTIES.

- 8. The Senate shall consist of the Fellows of the University Constitution of the (ex-officio and ordinary).
- 9. (1) The Chancellor* of the University shall be such person as the Governor-General exercising his individual judgment may nominate in this behalf.† He shall, by virtue of his office, be the Head of the President of the Senate and shall, when present, preside at meetings of the Senate and at any convocation of the University.
- (2) The Chancellor shall exercise such powers as may be conferred on him under the provisions of this Act.
- 10. The Chancellor shall appoint a Vice-Chancellor who shall, save as herein otherwise provided, hold office for two years, and shall be eligible for reappointment.

"The Governor of Bombay, for the the time being shall be the Chancellor of the University."

^{*&}quot;Under sub-section (1) of section 9 of the Bombay University Act, 1928 (Bombay Act IV of 1928), His Excellency the Governor of Bombay is hereby nominated to be the Chancellor of the University of Bombay with effect from the 1st April 1938 (Vide Government of India, Department of Education, Health and Lands, Notification (Education) No. F. 55-1 (iii)/38 E dated the 26th

[†] This has been substituted under the Government of India (Adaptation of Indian Laws) Order, 1937, passed on the 18th March 1937, for the following which occurred in Act IV of 1928:—

- 11. The Vice-Chancellor shall be responsible for the proper Powers of the administration of the University and shall, Vice-Chancellor.
- (a) in the absence of the Chancellor, preside at the convocation and meetings of the Senate;
 - (b) convene the Senate;
 - (c) preside when present at the meetings of the Syndicate and exercise such other powers as may be conferred on him by this Act, the Statutes, Ordinances and Regulations.
 - 12. (1) The Senate may create the office of the Rector by a Statute to be framed by a majority of at least three-fourths of the whole number of Fellows.
- (2) The Rector shall be a whole-time salaried officer of the University. He shall, subject to the approval of the Central Government* be appointed by the Senate and shall have rank and precedence next after the Chancellor and the Vice-Chancellor.
- (3) The Senate may, subject to the provisions of this Act, frame Statutes prescribing the manner of appointment of the Rector, the salary and conditions of his office and his powers and duties.
 - 13. (1) Fellows. The Fellows of the University shall be-

I. Ex-Officio.

- (A) (i) The Chancellor,
 - (ii) The Vice-Chancellor,
 - (iii) The Rector (if any),
 - (iv) The Registrar of the University,
- (B) (i) The Chief Justice of Bombay,
 - (ii) The Minister of Education, Bombay,
 - (iii) The Director of Public Instruction, Bombay,
 - (iv) The Surgeon-General with the Government of Bombay,
 - (v) The Director of Agriculture, Bombay,
 - (vi) The Secretary to the Government of Bombay, Public Works Department,
 - (vii) Vice-Chancellors of other Universities, if any, established by law in the Bombay Presidency, and holders of such other offices as are prescribed by Statutes: Provided that the number of such Fellows shall not exceed five.
- (C) All Heads of University Departments.

^{*} This has been substituted for 'Government,' under the Government of India (Adaptation of Indian Laws) Order, 1937, passed on the 18th March 1937.

6

ACT

II. Ordinary.

(A) Elected as prescribed below:—	
(i) By one electorate of Principals of colleges entitled to send up students for degree examinations from among themselves as under:—	18
*(a) Principals of Arts colleges as follows:—	
(1) one Principal elected by separate elections to represent the Principals of Arts colleges in each group as hereinafter defined	5
(2) three Principals elected by a separate election to represent the Principals of Arts colleges in all the groups as hereinafter defined	9
(b) Principals of Colleges of pure Science	1
(c) Principals of Colleges of Medicine	1
(d) Principals of Colleges of Agriculture	1
(e) Principals of Colleges of Engineering	1
(f) Principals of Colleges of Law	1
	.1
(ii) By University Teachers and Teachers including Principals from among themselves	20
(iii) One by Head-masters of schools in each group from among themselves	5
(iv) By public associations or bodies in British India as under:—	
(a) Municipal Corporation of the City of Bombay	1
(b) Indian Merchants' Chamber	1
(c) Chamber of Commerce (d) Millowners' Association, Bombay	1
(e) Millowners' Association, Ahmedabad	1
(f) Municipal Boroughs† of the Gujarat Group	1
(f) Municipal Boroughs† of the Gujarat Group (g) Municipal Boroughs† of the Deccan Group	1
(n) Municipal Boroughst of the Karnatak Group	1
(i) Municipal Boroughs† of the Konkan Group (Except Bombay City)	
(j) Municipal Boroughs† of the Sind Group	1
and the Karachi Municipality†	1
(k) District Local Boards of the Guigrat Group	1
(6) District Local Boards of the Decean Group	1
(m) District Local Boards of the Karnatak Group (n) District Local Boards of the Konkan Group	1
(o) District Local Boards of the Konkan Group	1

† The words "and the Karachi Municipality" were inserted under Act XIII of 1929.

^{*}This was substituted by Act XV of 1930 for the following which occurred in Act IV of 1928 :—

[&]quot;(a) Principals of Arts Colleges including at least one Principal of a college in each group as hereinafter defined......8."

[†]The expression "Municipal Boroughs" was, under Act XIII of 1929, substituted for "City Municipalities" which occurred in Act IV of 1928.

BOMBAY UNIVERSITY ACT	- 7
(v) By registered graduates (vi) By the Faculties	25 10
(vii) By the Bombay Legislative Assembly* of whom one shall be the representative of the University on the Assembly* if he is not already a member of the Senate	5
† Provided that—	
(1) every person elected under any of the entries (i), and (iii)** or under any of the Clauses (a), (b), (c), and (e) of entry (iv) shall hold the office of a Fellow so long as he occupies the office or comes under designation which entitled him to be so elected; and	(d) only the
(2) the Fellows representing the Bombay Legisla Assembly* shall hold office for the duration of Legislative Assembly* electing them and thereafter to the date on which new Fellows are elected by next Assembly*.	the r up
††(3) the Councillor of the Municipal Corporation of the of Bombay elected by the Fellows shall not be eligible be elected as a Fellow of the said body.	City le to
Explanation (1)—For the purposes of this section ‡ the Bor Presidency (excluding Aden) shall be divided into the follogroups—	nbay
Name of Group. Territorial extent of the Group.	
1. Gujarat Group Ahmedabad, Surat, Panch Mahals, Kaira Broach districts.	an

The City of Bombay and the Nasik, Thana, 2. Konkan Group Bombay Suburban, Ratnagiri and Colaba districts.

Poona, Satara, Sholapur, Ahmednagar, West-3. Deccan Group Khandesh and East-Khandesh districts.

Belgaum, Dharwar, Bijapur and Kanara Karnatak Group ... 4. districts.

Province of Sind. Sind

The Senate shall, by Statute, determine to which of the groups abovementioned, schools and colleges in Indian States § and other territories within the territorial limits of the University shall be attached.

† This was added by Act XV of 1930.

§ The words 'and other territories within the territorial limits of the University' occurring here were added by Act XV of 1930.

^{*} Under the Government of India (Adaptation of Indian Laws) Order, 1937, passed on the 18th March 1937, the expression 'Bombay Legislative Assembly' has been substituted for 'Legislative Council of the Governor of Bombay' and the word 'Assembly', for 'Council', occurring in Act IV of 1928.

This explanation under Act IV of 1928 contained the words "the Schools and Colleges in" between the words 'Section' and 'the'. These words were deleted by Act XIII of 1929.

^{**} The following was inserted by Bombay Act X of 1936 :-"or under any of the clauses (a), (b), (c), (d) and (e) of entry (iv)".

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Explanation (2)—The *Municipalities and District Local Boards mentioned in sub-clauses (f), (g), (h), (i), (j), (k), (l), (n), (n) and (o) are free to elect a person, who need not be a member of the Municipality or a District Local Board, to represent them on the Senate.

(B) Nominated by the Chancellor

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- (C) Donors to, or for the purposes of, the University of money or property to the value of not less than one lakh of rupees, if willing to serve, to be, subject to the provisions of sections 14, 15 and 17, Fellows for life.
- (D) One nominee of each of the bodies giving a donation to, or for the purposes of, the University of money or property to the value of not less than one lakh of rupees: Provided that the right of making any such nomination and, subject also to the provisions of sections 14, 15, 16 and 17, the tenure of any such nominee shall not extend beyond a period of twenty years from the date of the acceptance by the University of any such donation.

Explanation—For the purposes of this section the value of any property offered as a donation to the University shall mean the market value of such property on the date of acceptance of the donation by the Senate.

- (2) If, in the case of any election, the question is raised whether any person is or is not a Principal or a University Professor or University Teacher or Head-master or a Teacher the question shall be decided by the Vice-Chancellor.
- Office vacated by leaving India.

 Office vacated by leaving India.

 Office vacated by leaving India.

 Office vacated by without the intention of returning thereto, his office shall thereupon become vacant.
- (2) If the Vice-Chancellor is temporarily absent from India, the Chancellor may appoint another person to act as Vice-Chancellor during the absence of the absent Vice-Chancellor.
 - 15. (2) Any Ordinary Fellow may, by letter addressed to the Chancellor, resign his office and on the acceptance of the resignation the office shall become vacant.
- (2) If, for a period of twelve consecutive months, any Ordinary Fellow, except a Fellow for life, has not attended a meeting of the Senate, other than a convocation, the Chancellor may declare his office to be vacant.
- † (3) Any person, who holds any office in the University by virtue of his being a Fellow, shall cease to hold such office on his ceasing to be a Fellow.
- 16. (3) The Ordinary Fellows shall, save as herein otherwise Ordinary Fellows.

^{*}Act IV of 1928 had the word "city" between the words 'the' and 'Municipalities', but it was deleted by Act XIII of 1929.

[†] This clause was added by Act XV of 1930.

- (2) An Ordinary Fellow who has vacated his office may, subject to the provisions of this Act, be elected or nominated to be an Ordinary Fellow.
- The Central Government* may, on the recommendation of the Senate supported by at least two-thirds of the whole number of Fellows, cancel the appointment of a Fellow may be cancelled.

 The appointment of a Fellow may be of any person appointed or elected a Fellow of the University. As soon as such order is notified in the Bombay Government Gazette, the person so appointed or elected shall cease to be a Fellow; and he shall not be aligned to the contract of th

so appointed or elected shall cease to be a Fellow; and he shall not be eligible for re-appointment or re-election until the disqualification has been removed by the Central Government* by a notification in the Bombay Government Gazette.

- Powers of the Senate shall be the supreme governing body of the University and shall exercise all powers and perform all duties conferred or imposed on it by or under this Act as well as all powers of the University not provided for in this Act.
- (2) In particular, and without prejudice to the generality of the foregoing provision, the Senate may—
 - (a) save as provided in section 44, make, amend, or repeal Statutes and accept, reject or refer back but not amend draft Statutes submitted by the Syndicate;
 - (b) subject to the provisions of this Act, consider and cancel or refer back but not amend Ordinances of the Syndicate, and Regulations of the Academic Council;
 - (c) consider and pass resolutions on the Annual Report, Accounts and Estimates;
 - (d) consider the Annual Financial Statement placed before it by the Syndicate and pass it with such modifications as the Senate may think fit;
 - (e) make provision for the physical† training of students;
 - ‡(ee) make grants from the funds of the University towards the maintenance of any University Corps established for the University under the Indian Territorial Force Act, 1920;
 - (f) institute and maintain professorships and other teaching posts, University Departments and hostels, found scholarships and prizes, and encourage the pursuit of learning by other means;
 - (g) grant and confer degrees;
 - (h) elect office-bearers and authorities provided in this Act and Statutes;
 - (i) accept donations and endowments, and, if the interests of the University so require, give up any donation or endowment it has accepted;

^{*}This has been substituted for 'Local Government' under the Government of India (Adaptation of Indian Laws) Order, 1937, passed on 18th March 1937.

[†] Act IV of 1928 contained the words "and military" after the word Physical.' These words were repealed by Act XII of 1928.

[!] This was added by Act No. XII of 1928.

- (j) consider and decide appeals in cases where such appeal is provided for in the Statutes;
- (k) delegate any of its powers to such authorities or authority as it may deem fit; and
- (l) generally do all such other acts and things as may be necessary or desirable to further the objects of the University.

CHAPTER IV .- THE FACULTIES.

- 19. (1) The University shall include such Faculties as are constituted by the Senate by Statutes from time to time.
- (2) The Senate shall frame Statutes prescribing the constitution of each Faculty.
- (3) A Fellow may be assigned, on the recommendation of the Syndicate, to one or more Faculties.
- (4) The Syndicate shall frame Ordinances governing the conduct of business of each Faculty and the appointment by each Faculty of its Chairman (to be called the Dean).
- (5) The Senate may empower any Faculty to co-opt as members to serve on Boards of Studies controlled by it persons who possess special knowledge of the subjects of study represented by the Faculty, but who are not Fellows, in such manner and for such period as may be prescribed by the Syndicate by Ordinance:

Provided that the number of persons so co-opted by any Faculty shall not exceed half the number of Fellows assigned to that Faculty.

CHAPTER V .- THE SYNDICATE.

- 20. (1) The executive government of the University shall be vested in the Syndicate constituted as follows from among the Fellows:—
 - (a) the Vice-Chancellor;
 - (b) the Rector, if any;
 - (c) the Director of Public Instruction, Bombay;
 - *(d) seven persons elected by the members of the Academic Council from among themselves as follows:—
 - (i) one to represent each Faculty by separate elections, and
 - (ii) the remaining, if any, to represent the Academic Council generally.
 - (e) nine persons to be elected by the Senate from among the Fellows who are neither Principals, University Professors, University Teachers, Teachers, nor Head-masters.

*This was substituted by Act XV of 1930 for the following which occurred Act IV of 1928:—

"Seven persons elected by the members of the Academic Council from among themselves, provided that each Faculty shall be represented by at least one member."

- (2) Every member of the Syndicate shall hold office for three years, or until he ceases to be a Fellow, whichever period is shorter.
- The Senate shall frame Statutes prescribing the manner of election of elected members of the Syndicate and the conditions governing their term of office.
- (4) If, in the case of any election, the question, is raised whether any person is or is not a Prinicipal or a University Professor or University Teacher or Teacher or Head-master, the question shall be decided by the Vice-Chancellor.

Powers and duties 21. The Syndicate shall have power of the Syndicate.

(a) to direct the form, custody and use of the common seal

of the University;

- (b) subject to the powers conferred by this Act on the Senate, the Vice-Chancellor and the Rector (if any), to regulate and determine all matters concerning the University in accordance with the provisions of this Act, the Statutes and the Ordinances;
- (c) to accept, reject, return to the Academic Council for reconsideration, but not amend Regulations framed by the Academic Council;
- to frame the budget of the University for the considera-(d) tion of the Senate;
 - (e) to administer the funds and property of the University;
- (f) save as otherwise provided by this Act or the Statutes, to appoint on the recommendation of a Committee of Selection, if any, as required by the Act or Statutes the officers (other than the Chancellor, the Vice-Chancellor and the Rector), University Professors, University Teachers and servants of the University, to define their duties and the conditions of their service, and to provide for the filling of temporary vacancies in their posts;

(g) to accept, subject to the direction of the Senate, transfer of any moveable or immoveable property on behalf of the University;

(h) to arrange for and direct the inspection of colleges and

hostels, and to issue instructions for maintaining the efficiency of the colleges, and in case of disregard of such instructions, to recommend modification of the conditions of affiliation and to take such other steps as it deems proper;

(i) to call for reports, returns and other information from the colleges;

(j) to appoint examiners and to make Ordinances for the conduct of University examinations;

(k) to publish the results of the University examinations and other tests;

(1) to control the University library and to appoint a Library Committee: Provided that at least half the members of the Committee shall be appointed from the Academic Council;

- (m) to provide for buildings, premises, furniture, apparatus and other means needed for carrying on the work of the University;
- (n) to enter into, vary, carry out, and cancel contracts on behalf of the University in the exercise or performance of the powers and duties assigned to it by the Act and the Statutes;
 - (0) to make, amend and cancel Ordinances;
- (p) to fix, demand and receive such fees for the degrees to be conferred by it and upon admission into the University and for continuance therein and for other proposes of a like nature as may be prescribed by Statutes;
- (q) to make provision for post-graduate instruction and research; and
- (r) to exercise such other powers and perform such other duties as may be conferred or imposed on it by this Act or the Statutes;

Provided that the Syndicate shall not arrive at any decision in regard to matters referred to in clauses $(h)^*$ and (j) without inviting and receiving a report thereon from the Academic Council.

CHAPTER VI.—THE ACADEMIC COUNCIL.

- 22. The Academic Council shall consist of the following Constitution of the members, all of whom need not be Fellows:—Academic Council.
 - (i) the Rector, if any, otherwise the Vice-Chancellor..... the Chairman;

(ii) Deans of Faculties;

(iii) such number of representatives not exceeding five of the University Professors and whole-time University Teachers as may be determined by Statutes;

(iv) two Head-masters to be elected by the Senate from

among the Fellows;

- (v) twenty representatives of the Boards of Studies or groups of Boards of allied studies as may be determined by Statutes; and
- (vi) five persons elected by the Senate from among Fellows.
- 23. (1) The Senate shall frame a Statute prescribing the manner of election of the elected members of the Academic Council, and the conditions governing their term of office.
- (2) If in the case of any election the question is raised whether any person is or is not a University Professor or a whole-time Teacher or Head-master, the question shall be decided by the Vice-Chancellor.
- 24. The Academic Council shall frame Regulations as provi-Powers of the ded in this Act and shall have the following Academic Council. powers:—
 - (a) to regulate teaching and examinations within the University;

^{*} In Act IV of 1928, this was "(b)".

- (b) to determine and maintain the standards of examinations, remaining responsible for the maintenance of such standards;
- (c) to make Regulations laying down courses of study subject to the approval of the Syndicate;
- (d) to propose to the Syndicate the institution of new University teaching appointments, their duties and emoluments;
- (e) to propose to the Syndicate schemes for the constitution of University Departments. Faculties and Boards of Studies;
- (f) to make Regulations for the award of University scholarships and prizes;
- (g) to recommend to the Syndicate the names of persons to be appointed examiners;
- (h) to make Regulations prescribing equivalence of examinations;
- (i) to arrange for co-ordination of studies and intercollegiate lectures;
- (i) to make Regulations prescribing the conditions to be complied with by candidates, not being students of any college for degrees, diplomas, licenses, titles, marks of honour, scholarships and prizes conferred or granted by the University;
- (k) to exercise such other powers as may be conferred on it by Stautes; and
- (l) generally to advise the University on all Academic matters.

CHAPTER VII.—THE BOARD OF POST-GRADUATE STUDIES.

- 25. (1) The Board of Post-graduate Studies shall consist The Board of Post- of—graduate Studies
 - (i) the Rector, if any, otherwise the Vice-Chancellor..... the Chairman;
 - (ii) four members appointed by the Syndicate;
 - *(iii) three members appointed by the Academic Council;
 - *(iv) one University Professor appointed by the Academic Council.
- (2) The Board shall, subject to the Act, and Statutes, Ordinances and Regulations framed thereunder, control and co-ordinate post-graduate teaching and research in the University Departments and the colleges and shall recommend to the Syndicate what teachers in the colleges shall be recognized as University Teachers for Post-graduate instruction and research.

^{*}This was substituted by Act XV of 1930 for the following which occurred in Act IV of 1928:—

[&]quot;(iii) Four members appointed by the Academic Council, one of whom shall be a University Professor."

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CHAPTER VIII.—OTHER UNIVERSITY BODIES.

26. (1) The Senate may, from time to time, frame Statutes constituting Boards of Studies, defining their functions, and attaching each Board to one or more Faculties.

(2) The Senate may abolish any Board of Study so constituted

- 27. The Senate may, by Statutes, constitute and define the functions of such other bodies as it may from time to time deem necessary for the purpose of carrying out the work of the University, and may abolish any of the bodies so constituted.
- 28. (1) Whenever it is necessary to appoint a whole-time Committee of University Professor or University Teacher, a Selection. Committee of Selection shall be formed.
 - (2) The members of the Committee shall be:

(a) The Vice-Chancellor (Chairman),

(b) Four persons having special knowledge of the subject, to be selected as follows:—

(i) One, who shall be a member of a Faculty of the

University;——by the Academic Council.

Three, who shall not be Fellows, members of

- (ii) Three, who shall not be Fellows, members of Faculties,
 University Professors, University Teachers, or
 Teachers;—one by the Academic Council and
 two by the Syndicate.
- (3) The Committee shall investigate the merits of the various candidates, and shall report to the Syndicate the names, arranged in order of merit, of persons, if any, whom it considers to be suitable for the vacant post.
- (4) The Syndicate shall make the final selection out of the persons, if any, so recommended.

CHAPTER IX.—DEGREES.

- 29. The Senate may institute and confer such degrees, and Degrees, diplomas, grant such diplomas, licenses, titles and marks of honour in respect of degrees and examinations as marks of honour. may be prescribed by Statutes.
- 30. If not less than two-thirds of the members of the Syndicate recommend that an honorary degree be conferred on any person on the ground that he is in their opinion, by reason of eminent position and attainments, a fit and proper person to receive such a degree and where their recommendation is supported by not less than two-thirds of the Fellows present at a meeting of the Senate and is confirmed by the Chancellor, the Senate may confer on such person the honorary degree so recommended without requiring him to undergo any examination.
- Cancellation of degrees and the like and their restoration.

 Cancellation of degrees and the like and their categories.

 Cancellation of the like and their categories are degree, diploma, license, title or mark of honour has been conferred by the Senate or who is an Honorary Fellow, has been convicted of what is, in the opinion of

the Syndicate, a serious offence, the Syndicate may, after giving the person concerned an opportunity to explain, propose to the Senate that the degree, diploma, license, title or mark of honour or Honorary Fellowship be cancelled and, if the proposal is accepted by not less than two-thirds of the Fellows of the Senate and is confirmed by the Chancellor, the degree, diploma, license, title, mark of honour or Honorary Fellowship shall be cancelled accordingly.

(2) The degree, diploma, license, title or mark of honour may

subsequently be restored on good cause shown.

(3) The procedure for the restoration of a degree, diploma, license, title, or mark of honour, shall, as far as is practicable, be as in sub-section (1) of this section.

CHAPTER X.—UNIVERSITY FUND.

The fees charged by the Senate shall be carried toone General Fee Fund for the payment of expenses. University Fund. of the University.

*(2)

The accounts of income and expenditure of the University shall, once in every year, be submitted to the Central Government † for such examination and audit as the Government may direct.

CHAPTER XI.—STATUTES, ORDINANCES AND REGULATIONS.

- 33. (1) The Senate may, from time to time, make Statutes, not inconsistent with this Act, for all matters Statutes-their relating to the University. scope.
- (2) In particular, and without prejudice to the generality of the foregoing power, such Statutes may provide for-

(a) the declaration of any person to be a "Teacher" under

section 3(h).

the declaration of other bodies to be authorities of the

University as provided in section 7 (6);

(c) the manner of election of the elected Fellows and the elected members of the Syndicate, the Academic Council and the Board of Post-graduate Studies and the term and conditions of their office, the maintenance of a register of registered graduates and the filling up of casual vacancies in the Senate, the Syndicate, the Academic Council and the Board of Post-graduate Studies;

(d) the powers of the Vice-Chancellor;

(e) the appointment, conditions of office, powers and duties. of the Rector, if any, and the Registrar and of the officers and servants of the University;

(f) the prescribing of offices the holders of which shall be

ex-officio Fellows under section 13 (1) (B) (vii);

the constitution, reconstitution or abolition of Faculties:

- * Sub-section (2), which occurred in the Bombay University Act of 1928, but which has been subsequently deleted under the Government of India (Adaptation of Indian Laws) Order, 1937, passed on the 18th March 1937, ran as follows:
 - "(2) Government shall contribute to that Fund the sum of Rs. 1,17,000 per annum to be utilized for the recurring expenditure of the University Departments."
- † This has been substitued for 'Government of Bombay,' under the Government of India (Adaptation of Indian Laws) Order, 1937, passed on the 18th. March 1937.

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(h) the procedure at meetings of the Senate, the Syndicate, the Academic Council, the Board of Post-graduate Studies and the Faculties and the quorum of members to be required for the transaction of business;

(i) the duties of the Academic Council;

(i) the duties of the Reactions of Boards of Studies; the functions of each such Board, the procedure of such Boards and the quorum of members to be required for the transaction of business, and the attaching of each Board to one or more Faculties;

(k) the holding and control of the Matriculation Examina-

tion;

*(kk) the conditions to be complied with by schools desiring recognition for the purpose of sending up pupils as candidates for the Matriculation Examination and the conditions to be complied with by candidates for the Matriculation Examination whether sent up by recognized schools or not;

(1) the constitution, powers and duties of the authorities of

the University save as provided in this Act;

(m) the institution and conferment of degrees and the granting of diplomas, licenses, titles and marks of honour in respect of degrees and examinations;

(n) the registers of graduates and students to be kept by

the University;

(0) the institution of pension or provident fund for the benefit of the officers, teachers and other servants of the University;

(p) all matters which, by this Act, may be prescribed by

the Statutes; and

- (q) generally, all matters relating to the University for which there is no provision or insufficient provision in this Act and for which provision is, in the opinion of the Senate, necessary.
- 34. (1) The Statutes may be amended, repealed, or added to, Statutes—their by Statutes made by the Senate in the manner framing, amend-hereinafter provided.

 operation.
- (2) All Statutes framed by the Senate, from time to time, shall be submitted for sanction to the Chancellor and they shall not come into operation until the Chancellor has accorded his sanction thereto.
- (3) The Senate may take into consideration the draft of a Statute either of its own motion or on a proposal by the Syndicate.
- (4) The Senate before passing a Statute taken into consideration of its own motion and affecting the powers or duties of any officer or authority of the University, shall ascertain and consider the views of the officer or authority concerned and of the Syndicate thereon.
- 35. (1) Subject to the provisions of this Act and the Statutes, Ordinances-their the Syndicate may frame Ordinances to provide for making and scope. the Syndicate may frame Ordinances to provide for all or any of the following matters, namely:—
 - (a) the admission of students to the University;

[&]quot;Added by Act No. XII of 1928.

- (b) the courses of study to be laid down for all degrees and diplomas of the University;
- (c) the conditions under which students shall be admitted to the degree or diploma courses and to the examinations of the University, and be eligible for degrees, diplomas, licenses, titles and marks of honour; and the form of the certificate to be produced by a candidate for examination under section 37 and the conditions on which any such certificate may be granted;
 - (d) the recognition of colleges and hostels;
 - (e) [Repealed]*;
 - (f) the residence and conduct of students;
- (g) the number, qualifications and conditions of appointment of University Professors and University Teachers;
- (h) the fees to be charged for courses of instruction in the University given by University Professors and University Teachers, for tutorial and supplementary instruction given by the University, upon admission into the University and for continuance therein, for admission to the examinations, degrees and diplomas of the University, for the registration of graduates and for other purposes of a like nature;
- (i) the conditions of appointment, the mode of appointment and the duties of examiners;
 - (i) the conduct of examinations;
- (k) the conduct of business of each Faculty and the appointment of the Dean of each Faculty;
- (l) the duties and powers of the boards and committees to be appointed by the University jointly with any other University or body;
- (m) the discipline to be enforced in regard to the graduates and undergraduates in so far as they come within the jurisdiction of the University for purposes of study and examination;
- (n) the extension of University teaching in any suitable centre within the Presidency by means of University Extension Lectures or otherwise;
- (0) the rules to be observed and enforced by colleges in respect of transfer of students;
 - (p) the functions of each Faculty;
- (q) the fee (if any) to be paid for the entry or retention of a name on any register;
- (r) the inspection of colleges and the reports, returns and other information to be furnished by colleges;
 - (s) the registers of students to be kept by colleges;.
- (t) the appointment and duties of University Professors and University Teachers;
- (u) the mode of execution of contracts or agreements for or on behalf of the University;

^{*}By Act No. XII of 1928.

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(v) generally, all matters which by this Act or by the Statutes may be provided for by the Ordinances and all matters for which provision is, in the opinion of the Syndicate, necessary for the exercise of the powers conferred, or the performance of the duties imposed on the Syndicate by this Act or the Statutes:

Provided that the Syndicate shall not arrive at any decision in regard to matters referred to in clauses (b), (c), (d), (g), (i), (j), (n) and (o) without inviting and receiving a report thereon from the

Academic Council.

(2) All Ordinances made by the Syndicate shall, except as otherwise provided by this Act, have effect from such date as it may direct; but every Ordinance so made shall be laid on the table of the Senate as soon as may be and shall be considered by the Senate at its next meeting. The Senate shall have power, by a resolution passed by a majority of not less than two-thirds of the members present at such meeting, to cancel or refer for reconsideration any such Ordinance.

(3) The Vice-Chancellor shall, on the application of not less than fifty members of the Senate, suspend the operation of any such Ordinance until the Senate has considered it as provided in sub-

section (2).

36. (1) The Academic Council may make Regulations consistent with this Act and the Statutes and Ordinances to carry out the duties assigned to it thereunder and shall submit them to the Syndicate for approval.

- (2) All Regulations when approved shall, except as otherwise provided by this Act, have effect from such date as the Academic Council may direct; but every Regulation so made shall be placed on the table of the Senate as soon as may be, and shall be considered by the Senate at its next meeting. The Senate shall have power, by a resolution passed by a majority of not less than two-thirds of the members present at such meeting, to cancel or refer for reconsideration any such Regulation.
- (3) If the Syndicate does not approve of a Regulation the Regulation shall, on a requisition by at least five members of the Syndicate, be referred to the Senate who shall thereupon have all the powers of the Syndicate in this connection. If the Regulation is accepted by the Senate, the provisions of sub-section (2) shall apply to it.
- (4) The Vice-Chancellor shall, on the application of not less than fifty members of the Senate, suspend the operation of any such Regulation until the Senate has considered it as provided in subsection (2) or sub-section (3).

CHAPTER XII.—AFFILIATED COLLEGES.

Order of the Senate, and subject to any Statutes and Ordinances made in this behalf, no person shall be admitted as a candidate at any University examination, unless he produces a certificate from a college to the effect that he has completed the course of instruction prescribed.

- 38. Any college affiliated to the University before the passing of this Act may continue to exercise the rights Existing Colleges. conferred upon it by such affiliation, save in so far as such rights may be withdrawn, restricted or modified in the exercise of any power conferred by this Act.
 - **39.** (1) A college applying for affiliation to the University shall send a letter of application to the Registrar, and shall satisfy the Syndicate and the Academic Council—
 - (a) that the college is to be under the management of a regularly constituted governing body;
 - (b) that the qualifications of the teaching staff and the conditions governing their tenure of office are such as to make due provision for the courses of instruction to be undertaken by the college;
 - (c) that the buildings in which the college is to be located are suitable, and that provision will be made, in conformity with the Statutes and Ordinances, for the residence in the college or in lodgings approved by the college, of students not residing with their parents or guardians, and for the supervision and physical welfare of students;
 - (d) that due provision has been or will be made for a library;
 - (e) where affiliation is sought in any branch of experimental science, that arrangements have been or will be made in conformity with the Statutes and Ordinances for imparting instruction in that branch of science in a properly equipped laboratory or museum;
 - (f) that due provision will, so far as circumstances may permit, be made for the residence of the Principal and some members of the teaching staff in or near the college or the place provided for the residence of students;
 - (g) that the financial resources of the college are such as to make due provision for its continued maintenance; and
 - (h) that the college rules fixing the fees (if any) to be paid by the students have not been so framed as to involve such competition with any existing college in the same neighbourhood as would be injurious to the interests of education.

The application shall further contain an assurance that, after the college is affiliated, any transference of management and all changes in the teaching staff shall be forthwith reported to the Syndicate.

- (2) On receipt of a letter of application under sub-section (1), the Syndicate shall—
 - (a) direct a local inquiry to be made by a competent person authorized by the Syndicate in this behalf;
 - (b) make such further inquiry as may appear to them to be necessary; and
 - (c) report to the Senate on the question whether the application should be granted or refused, either in whole or in part,

embodying in such report the results of any inquiry under clauses (a) and (b).

And the Senate shall, after such further inquiry (if any) as may appear to them to be necessary, record their opinion on the matter.

(3) The Registrar shall submit the application and all proceedings, if any, of the Academic Council, the Syndicate and Senate relating thereto to the Central Government* who after such inquiry as may appear to them necessary, shall grant or refuse the application or any part thereof.

(4) Where the application or any part thereof is granted, the order of the Central Government * shall specify the courses of instruction in respect of which the college is affiliated; and, where the application or any part thereof is refused, the grounds of such refusal shall be stated.

- (5) An application under sub-section (1) may be withdrawn at any time before an order is made under sub-section (2).
- 40. Where a college desires to add to the courses of instruction in respect of which it is affiliated, the procedure prescribed by section 39 shall, so far as may be, be followed.
- 41. (1) Every college affiliated to the University, whether before or after the commencement of this Act, shall furnish such reports, returns and other information as the Syndicate, after consulting the Academic Council, may require to enable it to judge of the efficiency of the college.
- (2) The Syndicate shall cause every such college to be inspected from time to time by one or more competent persons authorized by the Syndicate in this behalf.
- (3) The Syndicate may call upon any college so inspected to take, within a specified period, such action as may appear to them to be necessary in respect of any of the matters referred to in subsection (1) of section 39.
- 42. (1) A member of the Syndicate who intends to move that the rights conferred on any college by affiliation be withdrawn in whole or in part, or modified, shall give notice of his motion and shall state in writing the grounds on which the motion is made.
- (2) Before taking the said motion into consideration, the Syndicate shall send a copy of the notice and written statement mentioned in sub-section (1) to the Principal concerned, together with an intimation that any representation in writing submitted within a period specified in such intimation on behalf of the college will be considered by the Syndicate.

Provided that the period so specified may, if necessary, be extended by the Syndicate.

^{*} This has been substituted for 'Government' under the Government of India. (Adaptation of Indian Laws) Order, 1937, passed on the 18th March 1937.

- (3) On receipt of the representation or on expiration of the period referred to in sub-section (2), the Syndicate, after considering the notice of motion, statement and representation and after such inspection by any competent person authorised by the Syndicate in this behalf, and such further inquiry as may appear to them to be necessary, and after consulting the Academic Council, shall make a report to the Senate.
- (4) On receipt of the report under sub-section (3), the Senate shall after such further inquiry (if any) as may appear to them to be necessary, record their opinion in the matter.
- (5) The Registrar shall submit the proposal and all proceedings, if any, of the Academic Council, the Syndicate and Senate relating thereto to the Central Government,* who, after such further inquiry (if any) as may appear to them to be necessary, shall make such order as the circumstances may, in their opinion, require.
- (6) Where, by an order made under sub-section (5), the rights conferred by affiliation are withdrawn, in whole or in part, or modified, the grounds for such withdrawal or modification shall be stated in the order.

CHAPTER XIII.—HONORARY FELLOWS.

- 43. (1) The Chancellor may nominate any person to be an Honorary Fellow for life, who is eminent for his attainments in any branch of learning, or is an eminent benefactor of the University, or is distinguished for services rendered to the cause of education generally.
- (2) Notwithstanding anything contained in this Act, any person appointed to be an Honorary Fellow under section 13 of the Indian Universities Act, 1904, shall continue to be an Honorary Fellow for life, and shall be deemed to have been so appointed under this Act.
- (3) A person shall not be debarred from appointment as Fellow, member of the Syndicate, member of the Academic Council or other office under this Act merely on the ground of being an Honorary Fellow.

CHAPTER XIV.—TRANSITORY PROVISIONS.

44. (1) Notwithstanding anything contained in this Act, the first Statutes, Ordinances and Regulations under this Act shall be framed by the Syndicate constituted under the Acts repealed by this Act (in this section referred to as "the present Syndicate") within such time before the date of coming into operations this health are expressed by the Chanceller shall be the chancel shall be the Chanceller shall be the chancel shall be the cha

may fix in this behalf, and on approval by the Chancellor, shall be deemed to have been duly made under this Act.

(2) If the present Syndicate fails to frame the Statutes, Ordinances and Regulations referred to in sub-section (1) within the time therein mentioned, the Central Government* may frame such Statutes,

^{*}This has been substituted for 'Government', under the Government of India (Adaptation of Indian Laws) Order, 1937, passed on the 18th March 1937.

Ordinances and Regulations, and the Statutes, Ordinances and Regulations so framed shall be deemed to have been made under this Act.

- Till the Senate is constituted as provided in this Act, the Senate and other University bodies constituted under the Acts repealed by this Act and existing on the date on which this Act comes into operation and all officers of the University shall continue in office.
- Until the various University bodies other than the Senate are duly constituted under this Act, all their duties (except that of framing Statutes, Ordinances and Regulations) shall be performed by one or more Committees appointed by the Chancellor who shall also frame rules for the proper working of those Committees.
- (5) If any difficulty arises as to the first constitution or reconstitution of any authority of the University after the commencement of this Act, or otherwise in first giving effect to the provisions of this Act, the Central Government, as occasion may require may by order do anything which appears to them necessary for the purpose of removing the difficulty.
- 45. (1) The Vice-Chancellor shall, after the Senate is constituted under this Act, divided by lot the first Elected and nomi-Fellows elected, and nominated under Part II (A) nated Fellows to retire and (B) of sub-section (1) of section 13 into five by rotation. equal groups, as far as possible, under each of the said heads the order of the groups being also determined by lot.
- (2) Subject to the other provisions of this Act, the Fellows in the first, second, third, fourth and fifth of the said groups shall hold office for one, two, three, four or five years respectively.
- (3) Fellows who have vacated their office under this section. shall be eligible for re-election and re-nomination.
- Nothing contained in subsections (1), (2) and (3) shall apply or shall be deemed to have applied in the case of Fellows. elected by the Bombay Legislative Assembly under entry (vii) under the heading-II-Ordinary (A) in sub-section (1) of section 13.
- 46. (1) The Vice-Chancellor shall, after the Syndicate is constituted under this Act, divide the members of Elected members of the Syndicate elected under clauses (d) and (e) of the Syndicate to retire sub-section (1) of section 20 into three equal by rotation. groups, as far as possible under each of the heads, the order of the groups being also determined by lot.
- (2) Subject to the other provisions of this Act, the members of the Syndicate in the first, second and third of the said groups shall hold office for one, two or three years respectively.
- (3) Members of the Syndicate who have vacated their officeunder this section shall be eligible for re-election.

^{*} This sub-section was added by Act XV of 1930.

[†] Under the Government of India (Adaptation of Indian Laws) Order, 1937, passed on the 18th March, 1937, the expression 'The Central Government' has been substituted for 'Government', and 'Bombay Legislative Assembly', for 'The Legislative Council of the Governor of Bombay,' occurring in Act.

CHAPTER XV .- GENERAL.

47. (1) If any question arises regarding the interpretation of any provision of this Act or of any Statute, Ordinase of doubt.

Interpretation in nance or Regulation, or as to whether any person has been duly elected or appointed as, or is entitled to be a member of any authority or other body of the University, the matter may be referred to the Chancellor, and shall be so referred if ten Fellows so require. The Chancellor shall, after taking such advice as he deems necessary, decide the question, and his decision shall be final.

(2) Nothing in this section shall be deemed to affect in any way the existing jurisdiction of the High Court of Bombay.

48. Every election to any authority of the University under this Act shall be made according to the system of proportional representation by means of the single transferable vote in such manner as may be prescribed by Statutes.

Proceedings not invalidated by vacancy.

The distribution of the body doing or passing it or by reason of any want of qualification by or invalidity in the election or appointment of any defacto whether present or absent.

Pension or Provident Fund.

Pension or Provident Fund.

Pension or Provident Fund.

Pension or Provident Fund.

Pension or Provident fund as it may deem fit in such manner and subject to such conditions as may be prescribed by the Senate by Statutes.

Passing of property and rights of whatever kind used, enjoyed or possessed by, and all interests of whatever kind owned by, or vested in, or held in trust by, or for the University as reconstituted.

Acts repealed by this Act as well as all liabilities legally subsisting against the said University shall pass to the University as constituted under this Act.

- The enactments specified in the Schedule shall be repealed to the extent specified in the fourth column thereof: Provided that—
- (a) this repeal shall not affect the validity of anything already done under any enactment hereby repealed; and
- (b) the appointments of the Registrar and all other officers and servants of the University, and of examiners, validly made under the Acts hereby repealed and subsisting on the date on which this Act comes into operation, shall be deemed to have been validly made under and for the purposes of this Act, and the Registrar and such officers, servants and examiners shall continue to hold office and to act, subject to the conditions governing the tenure of their office or employment, except in so far as such conditions may be altered by competent authority.

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ACT

SCHEDULE

ENACTMENTS REPEALED (Section 52)

Act of the Governor-General in Council

14000 1010	Year	Number	Short title	Extent of repeal
1, 3H	1857	XXII	The Bombay University Act, 1857.	So much as has not already been repealed.
	1904	VIII	The Indian Universities Act, 1904.	The whole Act.*

^{*} This was substituted by Act XX of 1930 for the following which occurred in Act IV of 1928:—

[&]quot;In sub-section (1) of section 6 the word "Bombay". In the First Schedule the heading "The University of Bombay" and the entries under that heading."

CHAPTER I.—THE SENATE.

Meetings of the Senate.

[Under Section 33 (2) (h) of the Act.]

(i) General.

- S. 1. Meetings of the Senate shall be held in the Sir Cowasji Jehangir Hall of the University, unless the Chancellor or the Vice-Chancellor otherwise directs.
- S. 2. The Chancellor, or in his absence the Vice-Chancellor, or in the absence of both, a member elected by the meeting presides at the meetings of the Senate. The Senior Member present shall take the Chair for and until such election only.
- S. 3. Twenty members of the Senate form a quorum, and all questions shall be decided by a majority of votes of the members present, the Chairman, in the case of an equality of votes, having a second or easting vote.
- Such proposals and amendments only as are immediately connected with the University of Bombay and are in accordance with the Act shall be entertained and debated in the Senate.
- S. 5. No proposal shall be entertained by the Senate that has not, in the first instance, been considered by the Syndicate, or submitted for a period of at least three months for consideration by the Syndicate: Provided that when any proposal has been duly brought before the Senate, it shall be competent to the Senate to deal with all amendments or modifications thereof which it is otherwise competent to the Senate to entertain.
- The Senate shall meet ordinarily once a year, between the 20th January and 15th February, on a date fixed by, and at other times when convened, by the Vice-Chancellor or, in his absence from the Presidency, by the Syndicate.
- S. 7. A meeting of the Senate shall be convened on the requisition of at least twenty members to the Vice-Chancellor.
- Sixteen clear days before the day fixed for a meeting of the Senate, the Registrar shall forward to each member of the Senate a statement of business to be brought before the meeting and of the terms of all Resolutions to be then proposed, together with the name of the proposer of each, intimation in writing of which has previously reached him. The inclusion of a Report of any Committee of the Senate in the Agenda Paper shall be held to be equivalent to notice of motion for its adoption.
- S. 9. Notice in writing of proposed amendments and the terms thereof and of motions for any change in the order of business as set forth in the statement must be forwarded so as to reach the Registrar eight clear* days before the day of meeting.

^{*&}quot;Clear days" means days exclusive of the day on which notice reaches the Registrar and of the day of meeting. Thus, if the meeting is fixed for Thursday and "five clear days" notice is required, the notice must reach the Registrar on the previous Friday; if for Saturday, the notice must reach him on the previous Saturday.

S. 10. The Registrar shall, five clear days before the day of meeting, forward to each member of the senate a statement of all the motions and amendments; and no motion or amendment, of which such notice has not been given, shall be put to the meeting, other than a motion for dissolution, adjournment, or suspension of the sitting, for passing to the next business on the statement, for directing the Syndicate to review their decision, for referring the matter under consideration to the Syndicate or a Faculty for report, or an amendment which shall be accepted by the Chairman as merely formal.

(ii) Order of Business.

- Each member, before he takes his place, shall register his attendance in a book placed for the purpose at the entrance of the place of meeting.
- At the expiration of a quarter of an hour from the time of meeting, the Chairman shall take notice whether there are twenty members present; and if there are not, the meeting shall forthwith be adjourned to such a date as the Chairman may appoint. Such adjournment shall be recorded by the Registrar under the signature of the Chairman. In the case of a meeting adjourned for want of a quorum, no quorum will be required.
- S. 13. At every meeting the business to be entertained shall, unless the meeting by a special vote otherwise determine, be taken in the following order:—
 - (1) The election, if it is part of the business to be entertained at the meeting, of the Chairman.
 - (2) The signing of the minutes of the previous meeting or adjourned meeting.
 - (3) The election, if it is part of the business to be entertained at the meeting, of any official of the University.
 - (4) The affiliation, the renewal of affiliation and the extension of affiliation of Colleges.
 - (5) The consideration of the Annual Financial Statement and/or motions for supplementary grants when they are part of the business to be entertained at the meeting.
 - (6) Any motion for a change in the order of business: Provided that such motions shall not affect the order hereinabove indicated, or give priority to any item of business over the items mentioned in (1) to (5) above or any of them.
 - (7) Any business and motions of which due notice has been given in the order in which such business and motions are entered in the statement of business, and motions to be brought forward subject to the provisions of this Statute and Statute 18.

(iii) Rules of Debate.

S. 14. Every motion shall be moved by the member in whose name it stands, or, if he is absent or declines to move it, it may be moved by any other member.

- S. 15. Every motion at a meeting must be seconded: otherwise it shall drop. The seconder of a motion may reserve his speech.
- S. 16. When a motion has been seconded, it shall be stated from the Chair.
- When the proposal has been thus stated, it may be discussed as a question to be resolved simply in the affirmative, or negative, or as proposed to be varied by way of amendment. When, before or after debate, no member rises to speak to the motion, the Chairman shall proceed to put the question to the vote in the manner hereinafter mentioned.
- A substantive proposal once brought forward shall not be proposed a second time at the same meeting, or at any adjournment thereof. A proposal substantially identical in part with one already disposed of may be brought forward at the same meeting or at any adjournment thereof with the omission of such part.
- Not more than one proposal and one amendment thereto shall be placed before the meeting at the same time. Each amendment shall be disposed of before the next is moved. All amendments, which are not withdrawn under Statute 28, or which do not violate Statute 21, shall be considered and voted upon. In case no notice of amendment under Statute 9 has been given, the Senate shall at once proceed to consider and to vote upon the proposal.
- S. 19A. In any debate a member may move (but shall not make any speech on the motion) 'that the question be now put', and unless it shall appear to the Chairman that such motion is an infringement of the rights of reasonable debate, the motion 'that the question be now put' shall be put to the vote forthwith, and decided without amendment or debate.
- S. 19B. When the motion 'that the question be now put' has been carried, the Chairman shall call upon the mover of the proposal or amendment under consideration to reply.
- No Fellow, save with the permission of the Senate as herein S. 19C. provided, shall speak for more than 20 minutes, when proposing a motion, or for more than 10 minutes when proposing an amendment, seconding or speaking to a motion or amendment, or when replying. Provided always that the said time limit shall only be operative when the Chairman, either suo motu or at the instance of a Fellow, draws the attention of the Senate to the fact that the time limit has been exceeded. On the attention of the Senate being thus drawn, the Chairman shall take the vote of the Senate whether the speaker shall be given a further period of 10 minutes or not. If the vote of the Senate is in the negative, the speaker shall bring his remarks to a close within such few sentences as the Chairman may at his discretion allow, but shall not otherwise continue to address the Senate. If the vote is in favour of the speaker continuing, he may address the Senate for a further period of 10 minutes, when the same procedure may be repeated, whether or not the Chairman's attention is drawn to the time limit.

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(iv) Amendments.

- S. 20. No amendment shall be proposed which would reduce the proposed to a negative form.
- S. 21. No amendment shall be proposed which raises a question already disposed of by the meeting, or is inconsistent with any resolution already passed by it.
- S. 22. The order in which amendments to a proposal are to be brought forward shall be determined by the Chairman with reference to their extent and mutual relation.
- S. 23. An amendment, the substance of which has been disposed of in part, may be modified by its proposer so as to retain only the parts not so disposed of.
- When an amendment has been moved and seconded, it shall be stated from the Chair, and then the debate may proceed on the original proposal and the amendment together; but so far as the question raised by the amendment is one on which he has not yet spoken, any member may speak to that question, though he has spoken on the original question, or a previous amendment.
- **S. 25.** (a) Every amendment shall be in such form that it modifies the original motion by any or all of the following methods:—
 - By addition of words;
 By deletion of words;
 - (3) By substitution of words;

and the mover may state the motion or the part thereof affected as it would stand when so amended.

- (b) An amendment must be relevant to and within the scope of the motion to which it is proposed.
 - (c) An amendment in the alternative should not be moved.
- S. 26. If any amendment be carried, it shall become part of the motion before the Senate, and the motion shall be modified accordingly.
- S. 27. When all the amendments have been considered, of which due notice has been given, the original motion, or the original motion as amended in course of debate, shall be placed before the Senate and put to the vote without further discussion.

(v) Withdrawal of a Question.

- S. 28. No question shall be withdrawn from the decision of the Senate without its unanimous consent. If the mover states his wish to withdraw a proposal or amendment and if no objection is stated thereto in the interval allowed by the Chairman for the purpose, the Chairman shall declare that the question is withdrawn with the consent of the Senate.
- S. 29. (vi) Resolution of the Senate into a Committee.
 - (a) The Senate may, when it thinks fit, resolve itself into a Committee to consider any item which may be on the Agenda of business.
 - (b) A motion for the resolution of a meeting into a Committee may be made by any member at any time (but not so

S. 30.

as to interrupt a speech) without the notice required under Statute 9, but can only be placed before the Senate for consideration if the Chairman gives permission for this to be done.

- (c) No speech shall be allowed in moving the motion.
- (d) No such motion shall be considered unless fifteen members rise in support thereof.
- (e) The motion, then having been duly seconded, shall be put to the meeting without further discussion and shall only be carried if two-thirds of the members present vote in its favour.
- (a) When the Senate decides in this manner to resolve itself into a Committee, the Chairman shall be the same as for the meeting of the Senate, and the quorum shall be the same as for a meeting of the Senate.
- (b) The manner in which the discussion of the matter under consideration shall be conducted shall be in the discretion of the Chairman. When, in the judgment of the Chairman, the matter has been sufficiently discussed, the Committee shall embody its conclusions in a report to be signed by the Chairman.
- (c) The period during which the Senate is sitting in Committee shall be considered as a suspension of the sitting of the Senate, and immediately it terminates, the Senate shall be again called to order by the Chairman, and the report of the Committee's deliberations presented to it by the Registrar.
- (d) If any of the resolutions of the Committee involve recommendations not covered by the motion and the amendments to that motion on the Agenda of the meeting, it shall not be considered by the Senate until notice of these has been given as required under Statute 9, and the meeting of the Senate shall be adjourned to allow this to be done.
- (e) A motion made as a result of the deliberations of such a Committee may be presented to the Senate without previous consideration by the Syndicate.

(vii) Adjournment, etc.

- A proposal "that this meeting be now dissolved" may be moved at any time as a distinct question, but not as an amendment nor so as to interrupt a speech. If the motion is carried, the business before the meeting shall drop.
- A proposal "that the meeting be now adjourned to some specified time" may be moved at any time as a distinct question, but not as an amendment nor, except on the motion of the Chairman, so as to interrupt a speech. If it be negatived, the debate shall be resumed. The same rule will apply to a meeting of the Senate in Committee.
- S. 33. No amendment shall be moved to a proposal under the last preceding Statute, except one for substituting a different time for that to which it is proposed to adjourn the meeting.
- S. 34. A meeting renewed or continued after an adjournment is to be deemed one with that preceding the adjournment: Provided that if the meeting be adjourned to such date as to admit of the notice

required by Statute 9, any amendment, otherwise in order, may be moved at an adjourned meeting if the notice so required be duly given.

- S. 35. The motion "that the meeting pass to the next business on the statement" may be made at any time as a distinct question, but not as an amendment, nor so as to interrupt a speech. If such a motion be carried, the proposal under consideration and the amendments thereto shall not be further dealt with at the meeting.
- S. 36. No motion for the dissolution, or for the adjournment, of the meeting, or for the suspension of the sitting, or to pass to the next business, shall be made or spoken to during a debate by any member who has spoken in the debate. Any such motion shall take the place of any question that may be before the meeting, and, if not withdrawn must be disposed of before such question.
- Statute has been brought forward and negatived, no other motion of that class shall be again brought forward until after the lapse of what the Chairman shall deem a reasonable time; nor shall a debate be allowed on such a second or subsequent motion brought forward during a debate on the same proposal discussed alone, or the same proposal and amendment discussed together.

(viii) Right of Speech and Reply.

- S 38. On each proposal, or proposal and amendment in debate, a member may speak once, subject to the provisions of Statutes 24 and 36.
- After the mover of a motion or amendment has spoken, the other members may, save as otherwise provided, speak to the motion in such order as the President may call upon them.
- Save in the exercise of a right of reply or as otherwise provided, no member shall speak more than once, except with the permission of the Chairman for the purpose of making a personal explanation; but, in such cases no debatable matter shall be brought forward.
- S. 41. The mover of a motion may speak a second time on the conclusion of a debate by way of reply.
- The mover of an amendment, or when there is no amendment, the mover of the original resolution, may reply upon the debate before each vote is taken. But the mover of a motion for a dissolution or adjournment, or for the suspension of the sitting, or for passing to the next business on the statement has no right to reply.
- S. 43. No member shall speak to the question after the mover has entered on his reply.
- S. 44. The Chairman has the same right of moving or seconding a motion or amendment and of otherwise taking part in the debate as any other member. When the Chairman thus takes part in the debate, he shall vacate the Chair whilst he is addressing the meeting, and the Chair shall during such time be taken by the Senior member present, not being the Chairman.

(ix) Points of Order.

- Any member may call the Chairman's attention to a point of order even whilst another member is addressing the meeting, but beyond stating the precise point of order raised, he shall not make a speech. Such a call pronounced by the Chairman to be vexatious, and any interruption or obstruction to the progress of the business before the Senate pronounced by the Chairman to be unseemly or unreasonable, shall be deemed a breach of order.
- S. 46. The Chairman shall be the sole judge on any point of order and may call any member to order; and, if the member so called to order shall, in speaking, disregard such call, the Chairman may direct him to sit down and thereupon another member may speak.
- S. 47. In the event of any contumacious disregard of a ruling or call to order by the Chairman, he may request the member so offending to leave the meeting, and on such request the member named by the Chairman shall be suspended from his functions as a member during the meeting, and shall be bound immediately to withdraw.

(x) Voting.

- S. 48.

 On putting any question to the vote, the Chairman shall call for an indication of the opinion of the Senate by a show of hands in the affirmative and negative, or by sitting and rising, and shall declare the result thereof according to his opinion. If the votes are actually counted, the number of votes on either side shall be recorded in the minutes.
- S. 49. Any member may then demand a Division except on a motion for adjournment, or a vote of the Senate taken under Statute 19C. Voting in all Divisions shall be by ballot.
- S. 50. The Chairman shall thereupon appoint four Tellers, two on each side; and shall give such directions for effecting the Divisions as he shall consider expedient.
- S. 51. In every Division only such members as were present at the putting of the question shall be entitled to vote. Voting shall be on papers supplied at the meeting by the Registrar and every voting paper shall be returned with or without the vote.
- Upon the Chairman announcing the Division to be closed, the Tellers shall state in writing the number on each side, sign the statement, and hand it to the Chairman, together with the voting papers (in two separate bundles), whereupon the Chairman shall declare the result of the Division to the meeting, and the result shall be recorded in the minutes.
- S. 53. If, after a Division has been taken, five members present shall demand a recount, the Chairman shall appoint two or more members to act with the Tellers who shall report the facts found by them to the Chairman, who shall thereupon declare the result to the meeting, and such declaration shall be conclusive.
- S. 54. Pending the recount, the Chairman may, in his discretion either suspend the sitting or call for such business as may, in his opinion, be most conveniently proceeded with. Business thus entered on shall be proceeded with; but on its disposal the regular order of subjects, if it has been departed from, shall be resumed.

(xi) Lapsing of Business.

All motions, together with their amendments, if any, on the Agenda of a Senate Meeting which have not been moved or voted upon for want of time or any other reason at the meeting to which the agenda relates, shall, at the close of the meeting, be deemed to lapse; such motions shall not be placed on the agenda of the next or subsequent meetings, save on receipt of a fresh notice from the mover of the same or from any other member of the Senate stating that he intends to move the proposal at such meeting. Statute 5 shall not apply to such proposals.

Provided, however, that a motion shall not lapse if a part thereof or an amendment thereto has been voted upon.

(xii) Minutes.

S. 55. After every meeting or adjourned meeting of the Senate, the Registrar shall, as early as possible, send a copy of the minutes of such meeting to the address of each member of the Senate. In the event of any exception being taken to the correctness of the minutes as circulated, the attention of the Chairman shall be called to the matter before he signs the minutes, and he shall make such alterations as he may find to be necessary.

CHAPTER II .- THE FACULTIES.

S. 56. Each Faculty shall consist of—

(a) Members of the Senate assigned to the Faculty;

- (b) Members co-opted by the Faculty to serve on Boards of Studies controlled by it as provided by Section 19 (5) (of the Act).
- from time to time consider and recommend his assignment to one of the Faculties, or, in the case of persons with special qualifications, to two or more Faculties. Such recommendation shall be considered and adopted or rejected at the next following meeting of the Senate.
 - (b) The qualifications of each Fellow recommended under (a) shall be stated to the Senate and recorded in the minutes of its meetings.
 - (c) If a person who has once held office as a Fellow again becomes a Fellow under any of the provisions of Section 13 of the Act, he shall, until the Senate assigns him to a Faculty or Faculties be deemed to belong to that Faculty or Faculties to which he was assigned during the last preceding tenure of his office.
 - (d) When a person co-opted by a Faculty is elected, nominated or appointed a Fellow, he shall cease to be a co-opted member of the Faculty, but he shall be deemed to belong to that Faculty as a Fellow till the Senate assigns him to a Faculty.
- S. 58. There shall be five Faculties, namely, of Arts, Science, Technology, Law and Medicine.

Chap. II]

THE FACULTIES

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- S. 59. Each Faculty shall meet ordinarily once a year, within three weeks after the fixed date of the Annual Convocation for conferring degrees, for the purpose of electing a Dean for the year, and at other times when convened by the Dean, or as provided by Ordinances.
- S. 60. A meeting of any Faculty shall also be convened by the Dean, or, in his absence, by the senior member of the Faculty, on the requisition of any three of its members.
- S. 61. The Dean, or the Senior Fellow present, shall be the Chairman at such meetings, and the Chairman shall have a vote, and in the case of an equality of votes, a casting vote.
- S. 62. Not less than one-fifth of the members of a Faculty shall constitute a quorum for a meeting of that Faculty.

Co-option to, and Functions of, the Faculties.

[Under Sections 35 (1) (p), 35 (1) (k) and 19 (5) of the Act.]

- 0. 1. When a Faculty resolves to co-opt members to serve on Boards of Studies controlled by it, the co-option of such members shall be made in the manner prescribed by Statutes 169-175.
- 1. The Notice of election shall state the number of members to be co-opted and the special subject of study in which the Faculty desires the co-operation of such additional members.
- Every co-opted member of a Faculty shall hold office for five years or until he ceases to be a member of the Board to serve on which he was co-opted, whichever period is shorter. A person who ceases to be a co-opted member of a Faculty, may be co-opted again to the same Faculty.
- O. 4. All questions at a meeting of the Faculty shall be decided by a majority of votes of the members present.
- 0. 5. The functions of a Faculty shall be-

(i) To elect its Dean.

- (ii) To consider and report on any matter referred to it by the Academic Council and the Syndicate.
- (iii) To remit any matter to a Board of Studies comprised within the Faculty for consideration and report.
- (iv) To consider any report or recommendation referred to it by a Board of Studies.

(v) To appoint a Committee of the Faculty for any purpose

lying within its functions.

- (vi) To hold meetings of the Faculty or of a Committee of the Faculty jointly with any other Faculty or a Committee thereof, for the discussion of any matter of common interest.
- (vii) To make any recommendation to the Syndicate and the Academic Council.
- 0. 6. Each Faculty shall conduct its business at a meeting to be convened for the purpose.

THE DEAN.

10. 7. Each Faculty shall elect its Dean from among the Fellows assigned to that Faculty at the meeting to be convened under Statute 59, provided, however, that a casual vacancy in the office of Dean occurring under Ordinance 11 may be filled up at a meeting of the Faculty to be convened by the Vice-Chancellor.

O. 8. Save as herein otherwise provided, a Dean shall hold office for one year or until another Dean is elected and may be re-elected. A Dean elected to fill up a casual vacancy shall hold office for the unexpired residue of the term of office of the Dean whose place he occupies.

0. 9. For the purpose of electing a Dean, the procedure shall be in so far as the same is applicable as prescribed in Statutes 129—139.

0. 10. The candidate who has received the highest number of votes at such an election will be declared the Dean of the Faculty.

O. 11. The office of the Dean shall be vacated by death, resignation, by the Dean ceasing to be a Fellow, or by his being absent from four consecutive meetings of the Academic Council, or from the Presidency of Bombay for more than four consecutive calendar months.

CHAPTER III .- THE SYNDICATE.

S. 63. The Syndicate shall meet ordinarily once a month and at other times when convened by the Vice-Chancellor, or, in his absence, by the Senior Fellow in the Syndicate.

S. 64. The seat of a person on the Syndicate shall be vacated by his death, resignation, absence from four consecutive ordinary meetings or ceasing to hold a particular office or to answer a particular designation by virtue of which he was elected.

S. 65. Nine members of the Syndicate shall constitute a quorum for a meeting of the Syndicate, and all questions shall be decided by a majority of votes of the members present.

S. 66. The Vice-Chancellor, or, in his absence, the Senior Fellow present shall preside at all meetings of the Syndicate. The Chairman at such meetings shall have a vote, and, in the case of an equality of votes, a casting vote.

S. 67. Every authority of the University except the Senate shall report on any subject that may be referred to it by the Syndicate.

S. 68. Any Faculty, or any member of the Senate, may make any recommendation to the Syndicate, and may propose any Statute or Ordinance for the consideration of the Syndicate.

S. 69. The Syndicate, in the exercise of its executive functions, may appoint Committees to carry out administrative work and define their functions, constitution and tenure.

SYNDICATE COMMITTEES.

(i) University Publication Board.

0. 12. The University Publication Board shall consist of :—

(i) The Vice-Chancellor;

(ii) Deans of Faculties;

Chap. III]

THE BOARD OF SPORTS

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(iii) Six persons, appointed by the Syndicate, two of whom shall be members of the Postgraduate Board.

Provided that the Heads of the University Departments shall be included among the members of the Board.

- 0. 13. Members of the Board shall hold office for three years. Any casual vacancy caused by death, resignation, etc., shall be filled up by the Syndicate by nomination. A member so nominated shall hold office for the unexpired residue of the term of office of the original member whose place he occupies.
- O. 14. The Board shall meet annually in September, or whenever convened by the Vice-Chancellor suo motu, or on the requisition of not less than three members of the Board. Five members shall form the quorum for a meeting of the Board.
- 0. 15. The Vice-Chancellor shall, if present, preside at meetings of the Board, and, in his absence, the Senior Fellow present shall preside.
- O. 16. All questions shall be decided by a majority of votes of the members present. The Chairman shall have a vote and, in the case of an equality of votes, he shall have a second vote.
- 0. 17. The functions of the Publication Board shall be :-
 - (1) to recommed to the Syndicate the publication grants of the University;
 - (2) to undertake, with the sanction of the Syndicate, the publication of:—

(a) a University Journal;

- (b) such of the results of the School of Postgraduate Studies and Research as the Board may decide for publication;
 - any other work, literary or scientific, considered suitable by the Board;

(d) text-books;

(e) University Extension Lectures.

(ii) University Board of Sports.

- O. 18. The University Board of Sports shall consist of the Presidents of each of the Local Committees (to be mentioned hereinafter) and of such other members not exceeding four as may be appointed by the Syndicate. The members appointed by the Syndicate shall hold office for one year but shall be eligible for re-appointment.
- (a) The Board shall meet in January and June, or whenever necessary, on such days as may be fixed by the Chairman of the Board.
 - (b) The Board shall elect its own Chairman, who shall hold office for one year or until another Chairman is elected. In the absence of the Chairman, the Board may elect one of its members present as Chairman of the meeting.

(c) The Board shall prepare the Budget for the succeeding year at their meeting in January and accounts at their meeting

in June.

0. 20. The powers and functions of the Board shall be :-

(i) to allot funds to Local Committees;

(Note:—Funds shall be allotted not exceeding one rupee to every rupee contributed by Local Committees.)

(ii) to organise University and Inter-University competitions and to frame rules for their conduct;

(iii) to appoint committees when necessary to assist them to discharge their functions;

(iv) to adjudicate on appeals, if any, from the decisions of Local Committees;

and (v) to exercise such other functions and powers as may be deemed necessary from time to time.

0. 21. There shall be Local Committees having jurisdiction as follows:—

Local Committee

Bombay Konkan Group.

Poona ... Deccan group minus Colleges in Kolhapur and Willingdon College.

Karnatak *cum* Southern Mahratta Country ...

Karnatak group *plus* Colleges in Kolhapur and Willingdon College.

Gujarat cum Kathiawar ... Gujarat group. Sind ... Sind group.

- A Local Committee shall consist of Principals of the Colleges lying within the jurisdiction of the Committee or their nominees appointed from among their staff with power to co-opt not more than three other members. The members so co-opted shall hold office for one year, but shall be eligible to be co-opted again on the expiry of their term of office.
- **0. 23.** Every Local Committee shall meet once in every term, and may meet oftener, on such days as may be fixed by the President of the Committee.
- **0. 24.** The powers and functions of a Local Committee shall be :— (i) to appoint its own office-bearers;

(ii) to appoint such sub-committees as may be required from time to time, and to determine their constitution, powers and functions;

(iii) to frame rules for the conduct of Inter-Collegiate Sports and Tournaments and to draw up the programme of its activities for the year;

(iv) to prepare the accounts of the current year and the budget of the succeeding year and submit them to the Registrar so as to reach him not later than the 15th January for the consideration of the Board of Sports;

(Note:—The budget of each Local Committee shall give the amount expected to be contributed by the Colleges lying within the jurisdiction of the Committee.) Chap. III]

THE LIBRARY COMMITTEE

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- (v) to settle disputes, if any, between Colleges under its jurisdiction.
 - (iii) The Library Committee.
- 0. 25. The Library Committee shall consist of twelve members appointed by the Syndicate, six of them being members of the Academic Council.
- 0. 26. The Senior Fellow among the members shall be the Chairman of the Committee.
- O. 27. The members of the Committee shall hold office for three years and may be re-appointed. The office of a member of the Library Committee shall be vacated by death, resignation, by the member being absent from four consecutive meetings, or by his ceasing to be a member of the Academic Council, if his appointment to the Committee was made on the footing of his being a member of the Academic Council. Any vacancy on the Committee shall be filled up by the Syndicate.
- 10. 28. The Committee shall meet once in every term, and at other times when convened by the Chairman. But the Chairman shall, on the requisition of not less than six members of the Committee, convene a meeting within fifteen days of the receipt of the requisition.
- **0. 29.** Six members of the Committee shall be the quorum for a meeting of the Committee.
- 0. 30. The Chairman if present, shall preside at all meetings of the Committee, and, in his absence, the next Senior Fellow shall preside.
- O. 31. All questions shall be decided by a majority of votes of the members present. The Chairman shall have a vote, and, in the case of an equality of votes, he shall have a second vote.

Powers.

0. 32. (i) The Library Committee shall, subject to the control of the Syndicate, manage the Library and advise the Syndicate on any matter connected with the Library referred to it by the Syndicate.

In particular and without prejudice to the generality of the foregoing power, the Committee shall have the power to (a) make recommendations to the Syndicate as to the administration of the funds set apart for the Library, as to the appointment of the staff of the Library, including the Librarian, and other matters connected with the Library and (b) to make rules governing the use of the Library from time to time, subject to the approval of the Syndicate.

- (ii) The Committee shall report to the Syndicate for confirmation the purchase of books and disposal of such books as in the opinion of the Committee are either worthless, unserviceable or otherwise useless. For the purpose of this Ordinance, books shall include manuscripts and periodicals.
- (iii) The Library Committee shall report from time to time to the Syndicate the rules framed by them for the use of the Library, and any changes made therein.
- 0. 33. The Library Committee shall keep an account of all funds provided for the purposes of the Library and forward a statement of such accounts to the Registrar for submission to the Syndicate every three months.

- 0. 34. There shall be a separate account in the Bank under the name of "Library Account."
- O. 35.

 All Bills in respect of books purchased for the Library shall be verified and checked by the Librarian and shall be countersigned by the Chairman of the Library Committee in attestation of their correctness.
- All cheques shall be signed by the Registrar after he has satisfied himself that the amounts entered in them are as they are in the bills and countersigned by a member of the Syndicate who is a member of the Library Committee.

[Ordinances 37 to 55 have been deleted.]

(iv) University Garden Committee.

- 0. 56. The University Garden Committee shall consist of 5 members, of whom 1 shall be the Executive Engineer, Presidency Division, and 1 shall be the Superintendent, Municipal Gardens. The other 3 members shall be appointed by the Syndicate for a period of three years.
- 0. 57. The Committee shall meet once a year before the Annual Convocation.
- 0. 58. The Committee shall be in charge of the upkeep of the University Gardens.

(v) University Building Committee.

- 0. 59. The University Building Committee shall consist of—
 - (i) The Vice-Chancellor.
 - (ii) The Executive Engineer, Presidency Division.
 - (iii) Two persons appointed by the Syndicate for a period of three years.
- 0. 60. The Committee shall meet once a year before the Annual Convocation, and at other times when convened by the Vice-Chancellor.
- 0. 61. The Vice-Chancellor shall preside at all meetings of the Committee, and, in his absence, the members will elect the Chairman.
- O. 62. The Committee shall be in charge of the University Buildings, excluding the Rajabai Clock Tower, shall recommend to the Syndicate any repairs, alterations or additions to the existing buildings which it may deem necessary or urgent, and shall advise the Syndicate in all matters relating to the University Buildings.

(vi) Rajabai Clock Tower Committee.

- O. 62A. The Rajabai Clock Tower Committee shall consist of the Vice-Chancellor, four members appointed by the Syndicate, and a member of the family of Sir Kikabhai Premchand, Kt., or a person nominated by him to serve on the Committee.
- O. 62B. The Committee shall meet once a year before the Annual Convocation and at other times when convened by the Vice-Chancellor.
- O. 62C. The Vice-Chancellor shall preside at all meetings of the Committee, and, in his absence, the Senior Fellow present shall preside. Three members of the Committee shall be the quorum for a meeting of the Committee.

The Committee shall be in charge of the Rajabai Clock Tower and the Clock therein, and shall recommend to the Syndicate any repairs, alterations or additions to the Rajabai Clock Tower which it deems necessary or urgent, and shall exercise supervision over the Clock in the Clock Tower, and advise the Syndicate on all matters relating both to the Clock and the Clock Tower.

(vii) Grants Utilization Committee.

- O. 63. The Grants Utilization Committee shall consist of the Vice-Chancellor and six other members appointed by the Syndicate for a period of three years.
- 0. 64. The Committee shall meet once a year after the Annual Convocation, and at other times when convened by the Vice-Chancellor.
- O. 65. The Vice-Chancellor shall preside at all meetings of the Committee, and in his absence the Senior Fellow present shall preside. Three members of the Committee shall form the quorum for a meeting of the Committee.
- O. 66. The Committee shall consider all applications for grants except those that come under "Publication Grants" and make its recommendations to the Syndicate.

(viii) Joint Consultation Committee.

[Under Section 35 (1) of the Act.]

A Board or Committee for joint consultation or work with any other University or Body shall, when necessary, be appointed by the Syndicate, and its powers and duties shall be defined by the Syndicate at the time of the appointment of such Board or Committee.

(ix) Foreign Universities Information Bureau.

Constitution of the Bureau.

- O. 68. The Bureau shall consist of the Vice-Chancellor, who shall be its ex-officio Chairman, and seven other members appointed by the Syndicate to represent the branches of Arts, Science, Law, Medicine, Commerce, Education and Technology. The Members to be appointed shall, as far as possible, be from among persons who are resident in Bombay.
- O. 68A. The term of office of a member of the Bureau shall be one year, and the Syndicate shall have the power to make appointments to fill up temporary vacancies caused by death, resignation, or from any other cause whatsoever. A member on retirement shall be eligible for re-appointment.
- 0. 69. The Bureau shall meet at least once in every three months, and at other times when convened by the Vice-Chancellor.
- O. 69A. The Vice-Chancellor shall preside at all meetings of the Bureau, and, in his absence, the members shall elect their own Chairman. Three members shall form the quorum for a meeting of the Bureau.

0. 70.

THE UNIVERSITY

Functios.

- The functions of the Bureau shall be
 - to collect and furnish information in regard to the Universities and other Educational Institutions of Great Britain and, as far as possible, of other foreign countries;
 - (2) to advise students:
 - (3) to correspond with Foreign Universities and other Institutions with a view to placing Indian students in suitable conditions of study in those Universities and Institutions.
 - to keep in constant touch with the work of the office and with applications and inquiries received by the office from students and from Foreign Universities and other Institutions from time to time.

Powers.

- (1) The Bureau shall have the power to correspond direct with 0. 71. such Universities, Institutions and persons as agree to such direct correspondence and, in other cases, the Bureau shall correspond with the Education Department of the Office of the High Commissioner for India.
 - (2) The Bureau shall have the power to take a deposit from any applicant who desires expenditure to be incurred on his behalf.
 - (3) The Bureau shall have the power to refuse to forward any application for reasons deemed by it sufficient.

Permanent Staff.

- The permanent staff shall consist of the following:-0. 72.
 - (1) A Secretary, whose duties may be entrusted at the Syndicate's discretion to any University officer, on an allowance of Rs. 200 a month.
 - (2) One clerk to be a member of the University Registrar's establishment in the grade of Rs. 55-4-115 (efficiency bar)-5-140 (3) One peon.

Students' Welfare Committee. (\mathbf{x})

The Students' Welfare Committee shall consist of :-O. 72A.

The Vice-Chancellor (ex-officio Chairman).

The Chairman of the Board of Sports (ex-officio). Two members elected by the Faculty of Medicine.

Five members elected from among themselves by the Principals of the Colleges in the five groups, one from each group, the Administrative Heads of the University Departments being for the purposes of this Ordinance deemed to be Principals of Colleges in the Konkan group.

Six members to be nominated by the Syndicate.

- Members of the Committee, other than the ex-officio members, shall hold office for a period of three years. A Principal of a College elected under the last clause but one of O. 72A shall cease to hold office on ceasing to be a Principal. Any casual vacancy caused by death, resignation or otherwise, shall be filled up by election or nomination, as the case may be, and a member elected or nominated in such vacancy shall hold office for the unexpired residue of the term of office of the original member whose place he occupies.
- **0. 72C.** The Committee shall meet once at least in every quarter, and at other times when convened by the Chairman *suo motu*, or on receipt of a requisition in writing by at least five members.
- 0. 72D. The quorum for a meeting of the Committee shall be five members.
- O. 72E. The Vice-Chancellor shall, if present, preside at the meetings of the Committee and, in his absence, the Senior Fellow present shall preside.
- O. 72F. All questions shall be decided by a majority of votes of the members present. The Chairman shall, in addition to his vote as a member, have an additional or a casting vote.
- 0. 726. The functions of the Committee shall be-
 - (i) to advise the Syndicate on—
 (a) the medical examination of students;
 (b) the physical training of students including U. T. C.
 - activities;
 (c) Hygiene;
 (d) Dietetics;
 - (e) Students' hostels;
 - (ii) to prepare the accounts of the current year and the budget of the succeeding year in respect of the items falling under (i) above, and to submit the same to the Registrar on or before the 15th February of each year for the consideration of the Syndicate.

(xi) Board of Visitors of the Department of Chemical Technology.

- 0. 72AA. The Board shall consist of the following members:—
 - The Vice-Chancellor (ex-officio Chairman).
 The Principal of the Royal Institute of Science (ex-officio Vice-Chairman so long as the University Department is housed in the East Wing of the Royal Institute of Science).
 - (3) The Head of the University Department of Chemical Technology.
 - (4) One member to be nominated by the Syndicate on the recommendation of Bombay Millowners' Association.
 - One member to be nominated by the Syndicate on the recommendation of the Ahmedabad Millowners' Association.
 - (6) to (11). Six members to be nominated by the Syndicate, of whom three shall, as for as possible, be—
 - (i) The Director of Industries, Bombay.

(ii) The Director of the Central Technological Laboratory,
Matunga.

(iii) The Principal of the Victoria Jubilee Technical

Institute.

Of the remaining three members, one shall be a member of the Syndicate who is not a member of the Faculty of Science; and the remaining two members shall belong either to the Faculty of Science or to the Faculty of Technology.

The Registrar of the University shall be ex-officio

Secretary of the Board.

0. 72 AB. Each member of the Board, other than the ex-officio members, shall hold office for a period of two years.

A member shall vacate his seat on the Board by resignation, absence from four consecutive meetings, or by ceasing to hold the office or fall under the description by virtue of which he was nominated a member.

O. 72 AD.

Any casual vacancy shall be filled up by the Syndicate by nomination, and the member nominated in such vacancy shall hold office for the unexpired residue of the term of office of the original member whose place he occupies.

0. 72 AE. 0. 72 AF. The quorum for a meeting of the Board shall be five members.

The Vice-Chancellor shall, if present, preside at meetings of the Board, and, in his absence, the Vice-Chairman, shall preside. In the absence of both the Vice-Chancellor and the Vice-Chairman, the Senior Fellow shall preside.

O. 72 AG. All questions shall be decided by a majority of the votes of the members present. The Chairman shall, in addition to his vote as a member, have an additional or a casting vote.

CHAPTER IV .- THE ACADEMIC COUNCIL.

S. 70. The number of representatives under Section 22 (iii) of the Bombay University Act shall be five of whom at least three shall be the Heads of University Departments.

S. 71. Each of the following Boards of Studies or groups of Boards of Allied Studies shall elect the number of representatives set against each in the following table:—

Board of Studies in	Number	of Members
(1) English Literature(2) Latin, Greek, Hebrew and Modern	•••	1
European Languages		1
(3) Persian, Arabic, Urdu, Avesta and Pah	ılavi	1
(4) Sanskrit, Pali and Ardha-Magadhi .		1
(5) Marathi, Gujarati, Kannada and Sindh	i	1
(6) History and Archaeology and Economi	ics,	
Politics and Sociology	•••	1
(7) Logic and Philosophy	•••	1
Clas	mind area	

Carried over...

Chap. IV]	THE AC	ADEMIC C	OUNCIL			43
The state of the state of		Brou	ight forwa	rd	7	
(8) Teaching (9) Commerce (10) Mathematics (11) Physics and Geold (12) Chemistry and Cl (13) Botany and Zoolo (14) Engineering (15) Agriculture, inclu (16) Laws (17) Medicine	nemical gy	 Technolo 	gy		1 1 1 1 1 1 1 2 3	

S. 72. The Academic Council will meet ordinarily once in three months, and at other times when convened by the Vice-Chancellor, or, in his absence, by the Senior Fellow on the Academic Council.

S. 73.

S. 78.

The office of a member of the Academic Council shall be vacated by death, resignation, or by the member being absent from four consecutive meetings, or ceasing to be a member of the body which he represents or by which he was elected.

The representatives referred to in sub-section (iii) and (v) of Section 22, shall be members of the bodies which they represent and shall be elected by the said bodies.

S. 74.

Ten members of the Academic Council shall constitute a quorum for a meeting of the Council, and all questions shall be decided by a majority of votes of the members present.

S. 75. The Vice-Chancellor, or, in his absence, the Senior Fellow present shall preside at all meetings of the Academic Council. The Chairman at such meetings shall have a vote, and, in the case of an equality of votes, a casting vote.

S. 76. Each Faculty or the Board of Postgraduate Studies shall report on any subject that may be referred to it by the Academic Council.

S. 77. The members of the Academic Council shall, save as provided in Statute 78, hold office for three years: Provided that persons who are elected members by virtue of holding a particular office or answering a particular designation shall hold office only so long as they continue to be in the particular office or answer a particular designation.

(i) The Vice-Chancellor shall, after the Academic Council is constituted under the Act, divide the members of the Council elected under clauses (v) and (vi) of Section 22 of the Act into three equal groups, as far as possible, under each of the heads, the order of the groups being determined by lot.

(ii) The members of the Academic Council in the first, second and third of the said groups shall hold office for one, two or three years respectively.

(iii) The members of the Academic Council who have vacated their office shall be eligible for re-election.

CC-0. ASI Srinagar Circle, Jammu Collection.

CHAPTER V.-(i) THE BOARD OF POSTGRADUATE STUDIES.

- S. 79. The Board of Postgraduate Studies shall meet ordinarily once in three months, and at other times when convened by the Vice-Chancellor, or, in his absence, by the Senior Fellow on the Board.
- S. 80. The office of member of the Board of Postgraduate Studies shall be vacated by death, resignation, or the member being absent from four consecutive meetings.

S. 81. The procedure at a meeting of the Board of Postgraduate Studies shall, as far as possible, be the procedure laid down for the Syndicate meetings in Statutes 65 and 66.

- S. 82. The Vice-Chancellor, or, in his absence, the Senior Fellow present, shall preside at all meetings of the Board of Postgraduate Studies. The Chairman at such meetings shall have a vote, and, in the case of an equality of votes, a casting vote.
- S. 83. Each Faculty shall report on any subject that may be referred to it by the Board of Postgraduate Studies.
- S. 84. The members of the Board shall, save as provided in Statute 85, hold office for three years.
- S. 85.

 (i) The Vice-Chancellor shall, after the Board of Post-graduate Studies is constituted under the Act, divide the members of the Board elected under clauses (ii) and (iii) of Section 25 (1) of the Act into three equal groups, as far as possible, under each of the heads, the order of the groups being determined by lot.
 - (ii) The members of the Board in the first, second and third of the said groups shall hold office for one, two or three years respectively.
 - (iii) The members of the Board who have vacated their office shall be eligible for re-election.

(ii) Postgraduate Teaching and University Departments.

(1) Postgraduate Teaching.

- O. 73. Postgraduate teaching shall, so far as possible, be carried on in the University, but the Board of Postgraduate Studies may approve of any other arrangement for the purpose.
- O. 74. Except in Engineering, and in special cases approved by the Syndicate on the recommendation of the Board of Postgraduate Studies, all candidates for postgraduate degrees must work under* a University Professor, a whole-time University Teacher or a University Teacher.
- O. 75. The University Teachers shall conduct the Postgraduate Studies under the control of, and subject to the bye-rules† made by, the Board of Postgraduate Studies.
- 0. 76. Subject to the Act, Statutes, Ordinances and Regulations, the Board of Postgraduate Studies may make bye-rules for the control and co-ordination of Postgraduate Studies in the University.

^{* &#}x27;To work under' means 'to work under the guidance or direction of'.

† Rules made by the Board of Postgraduate Studies Under O. 75 will be found in a separate Chapter at the end of the Handbook.

79.

0.

All candidates for postgraduate degrees shall apply to the University Registrar for registration of their names as postgraduate students. Each application shall be accompanied by a fee of Rs. 5, in the case of Masters' Degrees, and Rs. 10/- in the case of the Ph. D. Degree.

0. 78. (2) The University Departments.

There shall be the following University Departments in the University:—

(a) Department of Economics.

(b) Department of Sociology.(c) Department of Chemical Technology.

(3) The University Departments of Economics and Sociology.

The Senior University Professor, or when there is no Professor, the Senior whole-time University Teacher, shall be the Head of the Department. A University Teacher appointed to act temporarily as the Head of a University Department in the place of the permanent incumbent on leave, shall not be considered to occupy the office or come under the designation of the Head of a University Department for the purposes of section 13 (c) of the Bombay University Act.

O. 80. The salary of the University Professor shall be Rs. 800 rising by annual increments of Rs. 50, to Rs. 1,000 and of the whole-time University Teacher or Reader shall be Rs. 550, rising by annual increments of Rs. 50 to Rs. 750.

0. 81A. (4) The University Department of Chemical Technology.

There shall be one University Professor, two University Readers and three University Lecturers in the University Department of Chemical Technology.

Scales of salaries in this Department shall be as under :-

University Professor ... Rs. 800-50-1,000. University Reader ... , 400-30-550. University Lecturer ... , 250-25-400.

As a condition of his contract of service, a University Professor, Reader or Lecturer in any Department may be paid a personal allowance in addition to his graded salary, and it shall be open to the Syndicate to start him on a salary above the minimum of his grade, and nothing herein contained shall prevent the Syndicate from paying a fixed salary higher than the maximum of the scale to a University Professor, Reader or Lecturer as a condition of a special contract entered into between the University and such Professor, Reader or Lecturer. Provided always that the liability for any extra expenditure involved by the payment of a personal allowance or of a fixed salary higher than the maximum of the scale fixed above for a University Professor, Reader, or Lecturer shall not be incurred by the Syndicate without the previous sanction of the Senate.

0. 81B.

The fee for students in the University Departments shall be as under:—

(5) Tuition Fees.

University Departments of Economics and Sociology for the M. A. or the Ph. D. Degree ... Rs. 30 per term.

THE UNIVERSITY

University Department of Chemical Technology ...

Rs. 125 per term for graduates of the Bombay University and 200 per term for others.

Chapter VI.—(i) Boards of Studies. [Under Section 7 (6) and 33 (2) (j) of the Act.]

S. 86. Boards of Studies may be constituted by the several Faculties from among their members for the subjects of the University Studies as under:—

Faculty of Arts.

(i)	English Literature	(ix)	Kannada
(i) (ii)	Latin, Greek and Hebrew	(x)	Sindhi
(iii)	Persian and Arabic	(xi)	Urdu
(iv)	Modern European Languages		History and Archaeology
(v)	Sanskrit, Pali and Ardha-	(xiii)	Economics, Politics and
	Magadhi		Sociology
(vi)		(xiv)	Logic & Philosophy
(vii)	Avesta and Pahlavi Marathi	(vx)	Teaching
(viii)	Gujarati	(xvi)	Commerce
<u> </u>			

Boards (vi), and (xi) shall each consist of three members, Board (xv) shall consist of seven members and Boards (vii), (viii), (ix) and (x) shall each consist of not less than three and not more than five members. Each of the other Boards shall consist of not less than three and not more than eight members.

Faculties of Arts and Science.

Mathematics—The Board shall consist of eight members, of whom four shall be elected by the Faculty of Arts and four by the Faculty of Science.

Faculty of Science.

(i) Physics. (iii) Botany. (iv) Zoology.

Boards (i), (ii), (iii), (iv) and (v) shall each consist of five members.

Faculty of Technology.

(i) Engineering. (ii) Agriculture. (iii) Chemical Technology.

Boards (i), (ii) and (iii) shall each consist of not less than three and not more than eight members.

Faculty of Law.

One Board of Studies consisting of not less than three and not more than seven members.

Faculty of Medicine.

- (i) Anatomy, Physiology and Materia Medica. Members of this Board shall be not less than four and not more than six.
- (ii) Medicine, Surgery, Midwifery, Medical Jurisprudence, etc. Members of this Board shall be not less than seven and not more than ten.
- S. 87. The members of all Boards of Studies shall, save as otherwise provided, be elected every five years in the manner prescribed for the election to authorities other than the Senate laid down in Statutes 169-175, save that the scrutineers shall be appointed in the election of a member of a Board of Studies by the Dean of the Faculty.
- S. 87A. A member co-opted by a Faculty to serve on a Board of Studies shall become a member of such Board by virtue of his co-option as a member of the Faculty.
- S. 88. The office of member of a Board shall be vacated by death, resignation or by the member's being absent from four consecutive meetings.
- (a) Each Board shall elect its own President. Each meeting of a Board shall be convened by the President, or, in his absence from the Presidency, by the Senior Fellow on the Board.
 - (b) Not less than one-half of the members shall constitute a quorum.
 - (c) The President of a Board shall convene a meeting of the Board on the requisition of two members of the Board.
 - (d) Provided no member of a Board objects to such a course, any item of business before a Board may, at the discretion of the President, be disposed of by correspondence.
- S. 90. The duties of the Board shall be to recommend text-books, to recommend courses of study in their respective departments, to advise on all matters relating to their respective departments, referred to them by the Syndicate or the Academic Council or the Faculty to which they belong.
- S. 91. A Board of Studies may bring to the notice of the Academic Council, or the Syndicate, important matters connected with the examinations in its special subject or subjects and may also address the Faculty concerned on any matters connected with the improvement of the courses in its special subject or subjects.
- Any two or more Boards may, and at the request of the Academic Council or the Syndicate shall, meet and act in concurrence and render a joint report upon any matter which lies within the province of both. In such cases the joint meeting shall elect its own President. The quorum of a joint meeting of the Boards must include a full quorum of each Board represented, no member present being counted on more than one separate quorum.
- S. 93. All meetings of the Boards shall be convened through the Registrar, who shall keep a record of the proceedings of the meetings.

(ii) BOARD OF ACCOUNTS.

- S. 94. A Board of Accounts, consisting of three Ordinary Fellows of the University, not being members of the Syndicate, shall be elected annually by the Senate not later than the 31st January.
- S. 95. The Board shall meet ordinarily once every six months, and at other times when convened by the Chairman of the Board.
- S. 96. The Board shall examine and make an annual report to the Senate on the accounts of the University and of the Endowment and Trust Funds for the financial year commencing on the first day of July previous to the appointment of the Board.
- S. 96A. The Board shall make recommendations to and advise the Syndicate on all matters relating to the finances of the University on which Syndicate may seek its advice.
- A copy of the Budget prepared by the Syndicate shall be sent to all members of the Senate in the month of April every year, and the consideration of the Budget shall be an item on the Agenda of the next following meeting of the Senate.
- S. 98. The financial year of the University shall be from 1st July to 30th June.
- S. 99. (a) The members of the Board shall hold office for the twelve months immediately following their election.

(b) They shall be eligible for re-appointment at the expira-

tion of their office.

(c) All vacancies on the Board occurring between two Annual Elections shall be filled up by persons appointed by the Syndicate.

THE OFFICERS OF THE UNIVERSITY

CHAPTER VII.—THE CHANCELLOR.

Ex-officio.

[Vide Section 9 of the Act.]

Powers of the Chancellor.

Act:

[Vide Sections, 5 (Inspection of the University); 10 (appointment of Vice-Chancellor); 13 (B) (nomination of Fellows); 14 (2) (appointment of an acting Vice-Chancellor); 15 (2) (declaring a Fellow's place vacant); 30 (confirmation of the conferment of Honorary Degrees); 31 (1) (confirmation of the cancellation of degrees, etc.); 34 (2) giving sanction to Statutes passed by the Senate); 43 (1) (nomination of Honorary Fellows for life); 47 (Interpretation in cases of doubt re: any provision in the Act).]

CHAPTER VIII.—THE VICE-CHANCELLOR.

Appointment and Term of Office [Vide Section 10 of the Act.]

Powers of the Vice-Chancellor.

[Vide Sections, 11, 13 (2), 20 (4) and 23 (2) (deciding election questions); 35 (3) (suspending the operation of an Ordinance); 36 (4)

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THE REGISTRAR

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(suspending the operation of a Regulation); 45 (1) and 46 (1) (dividing the first Fellows and first Syndics into Groups).]

Whenever any emergency arises and there is no time to convene a meeting of any authority, the Vice-Chancellor may take such immediate action as he deems necessary, and shall report the circumstances to the next meeting of the authority concerned for confirmation of such action.

CHAPTER IX .- THE REGISTRAR.

- **S. 101.** The Registrar shall be appointed by the Syndicate. In case of necessity, the Vice-Chancellor is empowered to provide for the performance of the duties of the Registrar.
- S. 102. The appointment of the Registrar shall, in the first instance, be on probation for a period of five years. On the expiry of the said period, the appointment shall, subject to the age limit of sixty years, be made permanent if the Registrar has given satisfaction in his work, of which the Syndicate shall be the sole judge, provided, however, that it shall be competent for the Syndicate and the Registrar, at any time during the period of probation or thereafter, by either party giving not less than six calendar months' notice in writing to the other, or by mutual agreement, to terminate the tenure of his office: Provided that for the purpose of this Statute the period of service which may have been put in by a person holding the appointment of Registrar shall be counted towards his period of probation.
- S. 103. The duties of the Registrar shall be as follows :-
 - (a) To be the custodian of the records, Library, Common Seal, and such other property of the University as the Syndicate shall commit to his charge.
 - (b) To act as Secretary to the Syndicate and to attend all meetings of the Senate, Faculties, Syndicate, Academic Council, Board of Postgraduate Studies, Board of Accounts, Boards of Studies and Examiners, and such other Boards or Committees as may be appointed from time to time and to keep minutes thereof.
 - (c) To conduct the official correspondence of the Syndicate.
 - (d) To issue all notices convening meetings of the Senate, Faculties, Syndicate, Academic Council, Board of Postgraduate Studies, Board of Accounts, and Boards of Studies.
 - (e) To perform such other duties as may be, from time to time, prescribed by the Syndicate and generally to render such assistance as may be desired by the Vice-Chancellor in the performance of his official duties.
- S. 104. The salary of the Registrar shall be fixed by the Syndicate at a sum not exceeding Rs. 1,000 per mensem. The Registrar shall be entitled also to receive an annual honorarium, not exceeding one month's salary for conducting the University Examinations.
- S. 105.

 (a) Leave cannot be claimed as a right.
 (b) Leave is earned by duty only and shall be recorded in
 - the Registrar's leave account.

 (c) Leave, except disability leave, cannot be granted till it has been earned.

- (d) Public holidays may be prefixed (and-or) affixed to leave.
- (e) If the Syndicate recalls the Registrar before the expiry of his leave, the University shall pay the cost of the journey to Bombay from where the Registrar is at the time of his recall.
- (f) The Registrar shall earn leave on average pay at the rate of one-eleventh of the period of his active service.
- (g) The maximum amount of leave on average pay admissible-shall be one-eleventh of his total active service.
- (h) The maximum amount of leave in terms of leave on average pay that may be granted at any one time shall be four months.
- (i) The Syndicate may allow the Registrar to take leave on half average pay. When the Registrar takes such leave he shall be debited with half the amount of it in his leave account.
- (j) The Syndicate may grant to the Registrar special disability leave on average pay if it has been earned or on half average pay if it has not been earned in case of sickness or other sufficient reason.

Expluration—For the purposes of this Statute, average pay means the average monthly pay earned during the twelve complete months immediately preceding the month in which the event necessitating the calculation of average pay occurs.

- S. 106. If the Assistant Registrar or any other person in the service of the University be appointed the Registrar, he shall be entitled to whatever leave of absence has become due to him at the time of such appointment.
- S. 107. During the absence of the Registrar on leave, an Acting Registrar may be appointed by the Syndicate, who shall be paid at such rate not exceeding the salary of the Registrar, as the Syndicate may determine.

C. ELECTIONS.

Chapter X.—Elections to Authorities. [Under Sections 7, 48 & 33 (2) (c) of the Act.]

Definitions.

- S. 126. Every Professor, Reader and Lecturer giving instruction in any College except a Demonstrator, Fellow, Tutor, or a Lecturer in English Composition or a person holding an appointment of a similar character shall be deemed to be a "Teacher" within the meaning of Section 3 (h) and for all purposes under the Act. [Vide Section 13 (1) II A (ii].
- S. 127. Except as otherwise expressly provided for, all elections to the authorities will be held in accordance with this Chapter.
- S. 128. In this Chapter, unless there is anything repugnant in the subject-
 - (1) The expression "elector" with reference to the election of any authority means any person or a public association or body entitled to vote at such an election.

- (2) The expression "continuing candidate" means any candidate not elected or not excluded from the poll at any given time.
- (3) The expression "first preference" means the figure "I" standing alone opposite the name of a candidate; "second preference" means the figure "2" standing alone opposite the name of a candidate in succession to the figure "I"; "third preference" means the figure "3" standing alone opposite the name of a candidate in succession to the figures "I" and "2"; and so on.
- (4) The expression "next available preference" means second or subsequent preference recorded in consecutive numerical order for a continuing candidate, the preferences next in order on a voting paper for candidates already elected or excluded from the poll being ignored.
- (5) The expression "transferable paper" means a voting paper on which, following the first preference, a second or subsequent preference is recorded in consecutive numerical order for a continuing candidate.
- (6) The expression "non-transferable paper, means a voting paper on which no second or subsequent preference is recorded for a continuing candidate.

Provided that a paper shall be deemed to have become a non-transferable paper whenever—

(a) the names of two or more candidates (whether continuing or not) are marked with the same number, and are next in order of preference;

or

- (b) the name of the candidate next in order of preference (whether continuing or not) is marked—
 - (i) by a number not following consecutively after some other number on the voting paper

or

(ii) by two or more numbers;

or

- (c) for any other reason it cannot be determined for which of the continuing candidates the next available preference of the elector is recorded.
- (7) The expression "original vote" in regard to any candidate means a vote derived from a ballot paper on which a first preference is recorded for that candidate.
- (8) The expression "transferred vote" in regard to any candidate means a vote derived from a voting paper on which a second or subsequent preference is recorded for that candidate.
- (9) The expression "surplus" means the number of votes by which the total number of the votes, original and

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transferred, credited to any candidate, exceeds the quota.

(10) The expression "count" means—

- (a) all the operations involved in the counting of the first preferences recorded for candidates;
- (b) all the operations involved in the transfer of the surplus of an elected candidate;
- (c) all the operations involved in the transfer of the votes of an excluded candidate or of two or more candidates excluded together.
- S. 129. Subject to Section 47 of the Act, the Vice-Chancellor shall have power—
 - (a) to fix the date of election;
 - (b) to decide in cases of doubt the validity or invalidity of a vote recorded and to declare the results of each election.
- S. 130. The Vice-Chancellor shall have power to hold elections in anticipation of vacancies about to occur by efflux of time.
- S. 131. Except as otherwise provided for in the Act, the Registrar shall be responsible for the conduct of all elections.
- S. 132. The Registrar shall maintain an electoral roll for each of the electoral bodies entitled to elect a member to the authorities of the University showing the names, degrees and addresses of all persons, or the names and addresses of all public associations and bodies, as the ease may be, qualified to vote.
- S. 133. The persons, public associations or bodies, as the case may be, entitled to vote at any election of any of the authorities shall be respectively the persons or public associations or bodies whose names are entered on their respective rolls.
- S. 134. On the occurrence of a vacancy in any of the authorities—
 - (a) the notice of election shall be forwarded to all electors stating the date fixed as the last day for receiving nominations and the date of election;
 - (b) a list of candidates nominated, giving in full, names, places of abode and designation, shall be forwarded to every elector at his registered address.
- S. 135. Any two electors, or any two members of a public association or body entitled to a vote, as the case may be, may nominate as a candidate any person of lawful age and not subject to any legal incapacity or disqualification, by sending to, or delivering at, the University office a nomination paper before 4 o'clock afternoon, (a) three clear weeks before the date of election in the case of the Senate, and (b) fifteen clear days in the case of other authorities.
- S. 136. In the case of a dispute or doubt, the Vice-Chancellor shall determine whether a person is disqualified under the Statutes or not.

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- S. 137.
- Nomination papers must be dated and signed by two electors or by two members of the public associations or bodies entitled to vote, as the case may be, and, where possible, must contain the names in full, places of abode and designations, if any, of the two signatories and of the candidate nominated.
- S. 138.
- No elector or member of a public association or body entitled to vote shall propose or second the nomination of more persons than may be required to fill up the vacancies.
- S. 139.
- If the number of candidates nominated does not exceed the number of vacancies to be filled the candidates so nominated shall be declared to have been duly elected.
- S. 140.
- A voting paper shall be, as far as possible, in the following form:—

VOTING PAPER.

The Bombay University.

Election by.....

Mark order of preference in spaces below.	Names of candidates.		

S. 140A.

The Registrar shall send to each elector at his registered address (a) a voting paper bearing the name of the constituency, (b) a smaller cover bearing the name of the constituency, and (c) a bigger cover on which are printed, on the left half the number of the elector and the name of the constituency and a form of the certificate of identity, and on the right half the words: "To the Registrar, University of Bombay." The voter shall enclose the voting paper duly filled in, but without the name or the signature of the voter, in the smaller cover and enclose this again in the bigger cover, sign the certificate of identity on it, get his signature attested if any attestation be required, and send it to the Registrar so as to reach the University Office before the time announced for the election.

- An elector who has not received his voting paper and other connected papers sent by post or whose papers, before their despatch back to the Registrar, have been inadvertently spoilt in such manner that they cannot be conveniently used or who has lost his papers may, on his transmitting to the Registrar a declaration to that effect signed by himself, require the Registrar to send him new papers in place of those not received, spoilt or lost; and if the papers have been spoilt, the spoilt papers shall be returned to the Registrar who shall cancel them on receipt. In every case when new papers are issued, a mark shall be placed against the number of the elector's name in the Register to denote that new papers have been issued in place of those not received, spoilt or lost.
- S. 142. All voting papers shall be scrutinized by the Registrar and Fellows of the University, not more than eight in number, nominated by the Vice-Chancellor.
- S. 143. (1) Each elector shall have one transferable vote.
 - (2) An elector in recording his vote-
 - (a) must place on his voting paper the figure 1 opposite the name of the candidate for whom he votes: and
 - (b) may in addition indicate the order of his choice or preference for as many other candidates as he pleases by placing against their respective names the figures 2, 3, 4, 5 and so on, in consecutive numerical order.
- S. 144. A voting paper is invalid on which-
 - (a) the figure 1 standing alone, indicating a first preference, is not placed;
 - (b) the figure 1 standing alone, indicating a first preference, is placed opposite the name of more than one candidate;
 - (c) the figure 1 standing alone, indicating a first preference, and some other figure are placed opposite the name of the same candidate;
 - (d) it cannot be determined for which candidate the first preference of the voter is recorded;
 - (e) in an election by ballot any mark is placed by the voter by which he may afterwards be identified.
 - S. 145. After the voting papers for an electoral body have been counted, the Registrar shall examine the voting papers and shall sort them into parcels according to the first preferences recorded for each candidate, rejecting any that are invalid.
- S. 146. The Registrar shall then count the number of papers in each parcel and shall credit each candidate with a number of votes equal to the number of valid papers on which a first preference has been recorded for such candidate, and he shall ascertain the total number of valid papers.

- S. 147. The Registrar shall then divide the total number of valid papers by a number exceeding by one the number of vacancies to be filled. The result increased by one (any fractional remainder being disregarded) shall be the number of votes sufficient to secure the election of a candidate. This number is herein called the "quota."
- S. 148. If, at the end of any count, the number of votes credited to a candidate is equal to or greater than the quota, that candidate shall thereupon be elected.
- S. 149.

 (1) If, at the end of any count, the number of votes credited to a candidate is greater than the quota, the surplus shall be transferred, as in this Statute provided, to the continuing candidates for whom the next available preferences have been recorded on the voting papers in the parcel or sub-parcel last received by the elected candidate.
 - (2) (a) If more than one candidate has a surplus, the largest surplus shall be first dealt with.
 - (b) If two or more candidates have each an equal surplus, the surplus of the candidate with the greatest number of votes at the first count at which the candidates in question have an unequal number of votes shall be first dealt with. When the numbers of votes credited to such candidates are equal at all counts, the Registrar shall determine which surplus he will first deal with.
 - (3) The Registrar need not transfer a surplus when that surplus, together with any other surplus not transferred, is less than the difference—
 - (a) between the votes of the candidate lowest on the poll and the votes of the next highest candidate;

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- (b) between the total of the votes of the two or more candidates lowest on the poll and the votes of the next highest candidate, provided that the exclusion from the poll of the aforesaid two or more candidates lowest on the poll shall not reduce the number of continuing candidates below the number of vacancies remaining to be filled.
- (4) (a) If the votes credited to an elected candidate consist of original votes only, the Registrar shall examine all the papers contained in the parcel of the elected candidate whose surplus is to be transferred;
 - (b) If the votes credited to an elected candidate consist of original and transferred votes, or of transferred votes only, the Registrar shall examine the papers contained in the sub-parcel last received by the elected candidate whose surplus is to be transferred;
 - (c) In either case the Registrar shall sort the transferable papers into sub-parcels according to the next available preferences recorded thereon, shall make a separate

sub-parcel of the non-transferable papers and shall ascertain the number of papers in each sub-parcel of non-transferable papers.

- (5) If the total number of papers in the sub-parcels of transferable papers is equal to or less than the surplus, the Registrar shall transfer the whole of each sub-parcel of transferable papers to the continuing candidate indicated thereon as the electors' next available preference, and shall set aside as a separate parcel so many of the non-transferable papers as are not required for the quota of the elected candidate. The particular papers set aside shall be those last filed in the parcel of non-transferable papers.
 - (6) (a) If the total number of transferable papers is greater than the surplus, the Registrar shall transfer from each sub-parcel of transferable papers to the continuing candidate indicated thereon as the electors' next available preference the number of papers which bears the same proportion to the number of papers in the sub-parcel as the surplus bears to the total number of transferable papers.
 - (b) The number of papers to be transferred from each sub-parcel shall be ascertained by multiplying the number of papers in the sub-parcel by the surplus and dividing the result by the total number of transferable-papers. A note shall be made of the fractional parts, if any, of each number so ascertained.
 - (c) If, owing to the existence of such fractional parts, the number of papers to be transferred is less than the surplus, so many of these fractional parts taken in the order of their magnitude, beginning with the largest, as are necessary to make the total number of papers to betransferred equal to the surplus shall be reckoned as of the value of unity, and the remaining fractional parts shall be ignored.
 - (d) If two or more fractional parts are of equal magnitude, that fractional part shall be deemed to be the largest which arises from the largest sub-parcel, and if the sub-parcels in question are equal in size, the fractional part credited to the candidate with the greatest number of votes at the first count at which the candidates in question have an unequal number of votes shall be deemed to be the largest. When the numbers of votes credited to such candidates are equal at all counts, the Registrar shall determine which fractional part shall be deemed to be the largest.
 - (e) The particular papers transferred from each sub-parcel shall be those last filed in the sub-parcel and each paper so transferred shall be marked in such a manner as to-indicate the count at which the transfer took place.

- S. 150.
- (1) If, at the end of any count, no candidate has a surplus, or if any existing surplus need not be and is not transferred, and one or more vacancies remain to be filled—
 - (a) the Registrar shall exclude from the poll the candidate lowest on the poll;
 - (b) if the total of the votes of the two or more candidates lowest on the poll together with any surplus not transferred is less than the number of votes credited to the next highest candidate, the Registrar may at the same count exclude the aforesaid two or more candidates lowest on the poll, provided that the exclusion of these candidates shall not reduce the number of continuing candidates below the number of vacancies remaining to be filled.
- (2) If, when a candidate has to be excluded, two or more candidates have each the same number of votes and are lowest on the poll, the candidate with the lowest number of votes at the first count at which the candidates in question have an unequal number of votes shall be excluded, and, when the number of votes credited to these candidates are equal at all counts, the Registrar shall determine which shall be excluded.
- (3) Upon the exclusion af any candidates, the Registrar, save as hereinafter provided, shall examine all the papers credited to that candidate; shall sort the transferable papers into sub-parcels according to the next available preferences recorded thereon for continuing candidates; shall transfer each sub-parcel to the candidate for whom that preference is recorded; and shall set aside as a separate sub-parcel the non-transferable papers.
- S. 151. (1) If, at the end of any count, the number of elected candidates: is equal to the number of vacancies to be filled, no further transfer of votes shall be made.
 - (2) If, on the exclusion of a candidate or candidates, the number of the then continuing candidates is equal to the number of vacancies unfilled, the continuing candidates shall thereon be elected, and no further transfer of votes shall be made.
- The order of priority of election of elected members shall be the order in which they are severally elected. If, at the end of any count two or more candidates are elected, the order of priority shall be the order of magnitude to the numbers of votes credited to such candidates beginning with the greatest.
- (1) Whenever any transfer is made, each sub-parcel of papers transferred shall be placed on the top of the parcel, if any, of papers of the candidate to whom the transfer is made and that candidate shall be credited with a number of votes equal to the number of papers transferred to him.
 - (2) Non-transferable papers (except such as in the transfer of a surplus may be required for the quota of the elected candidate) shall be set aside as a separate parcel together with any parcel of non-transferable papers already set aside.

- (3) On the transfer of the surplus of an elected candidate, all papers not transferred to continuing candidates and not set aside as provided in the preceding paragraph, shall be placed together in one parcel as the quota of the elected candidate and the parcel shall be marked with the name of the elected candidate.
- S. 154. After the scrutiny is completed, the Registrar shall forthwith report to the Vice-Chancellor the names of the required number of candidates who have received the highest number of votes.
- S. 155.

 On the result of the election being reported as aforesaid, the voting papers shall be destroyed, and the results of the scrutiny, showing for each candidate the number of first votes obtained and the successive additions to or subtractions from the number till he or she was excluded or elected, shall be published by the Registrar.

CHAPTER XI.—ELECTIONS TO THE SENATE.
[UNDER SECTION 33 (2) (c) OF THE ACT.]

(i) General.

- S. 156. The procedure for the election of Ordinary Fellows shall be, as far as possible, the one prescribed in Chapter X, subject, however, to the provisions of this Chapter.
- S. 157. The names of persons, public associations or bodies, as the case may be, entitled to vote shall be entered in their respective rolls at least seven clear weeks before the date of election, provided that the electoral roll of the registered graduates shall be compiled only once in the year on the 31st of March.
- Before the electoral roll of the registered graduates is revised, copies of the old roll shall be kept in all the colleges from the 1st January till the 31st March, and the public shall be informed that applications for changes in the roll, if any, should be made so as to reach the Registrar before the 31st March. All such applications shall be disposed of by the Vice-Chancellor, whose decision in the matter shall be final.
- S. 157B.

 The Vice-Chancellor shall have the authority to correct the rolls by adding, altering or omitting names, if any omission or wrong entries be brought to his notice within a fortnight from the date of the publication of the rolls; provided, however that in the case of the electoral roll of the registered graduates, in the event of any omission or mistake in such roll being discovered, the roll may be rectified at any time by the Registrar with the permisson of the Vice-Chancellor. The Vice-Chancellor's decision in this respect shall be final.
- S. 158.

 In the case of election of Ordinary Fellows:—

 (a) the notice of election shall be forwarded to every elector under Statute 134 and also shall be published in the Bombay Government Gazette at least five clear weeks before the date of
 - (b) the list of nominations shall be forwarded to the electors as provided for by Statute 134 and shall also be published in

the Bombay Government Gazette at least 15 clear days before the date of election.

- S. 159.
- (a) The certificate of identity required by Statute 140A, shall be signed by the elector or the President of the public association or the body entitled to vote, and shall be attested by a Magistrate, a Justice of Peace, a Judicial or Political Officer, a Gazetted Officer of Government, a member of the Senate of the University of Bombay for the time being, the Principal of an affiliated College, the head of a recognized High School, or a Teacher as defined by Statute 126.
- (b) In Indian States the certificate of identity may be attested by an Officer in the Political Department in the British Service not lower in rank than a Thanadar exercising Magisterial powers or by a Magistrate of an Indian State whose signatures should be authenticated by the counter-signature of the Chief or the Karbhari or the Chief Judge of the Indian State or of a Political Officer not lower in rank than an Assistant Political Agent or Deputy Political Agent.
- S. 160. The names of the elected candidates shall be published in the Bombay Government Gazette.
- S. 161.
- (a) If any candidate is elected to the Senate by more than one constituency, he shall, by notice in writing, signed by him and delivered to the Registrar of the University within 15 days of the publication in the Gazette of the result of the last of such elections, choose which of these constituencies he shall represent, and such choice shall be conclusive.
- (b) When any such choice has been made, the Vice-Chancellor shall direct the Registrar to take steps for holding an election in the constituency in which a vacancy has occurred by reason of such choice.
- (c) If the candidate does not make the choice referred to herein within the specified period of time, the Vice-Chancellor shall decide which constituency he will represent and his decision shall be final. The Vice-Chancellor shall thereupon direct the Registrar to take steps for holding an election in the constituency in which a vacancy has occurred in virtue of such decision.

(ii) Election of Fellows by Public Associations and Bodies.

- S. 162.
- The Registrar shall notify to the several public associations and bodies referred to in Section 13 II (A) (iv) (a), (b), (c), (d), (e), and (vii) of the Act, requesting them to elect their representative to be a Fellow of the University. Within five weeks of such notification, or in their next sittings whichever is the later, such election shall be held by the respective associations and bodies under rules to be made by them in this behalf and, on the election being held, the said associations and bodies shall each of them make a return to the University intimating the names, degrees and addresses of the persons so elected by them.

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(iii) Election of Ordinary Fellows by Registered Graduates.

S. 163 and S. 164 have been deleted.

0. 122. Printed copies of the Roll shall be delivered to any person requiring the same on payment of a fee of Rs. 5 per copy.

(iv) Election of Ordinary Fellows by Faculties.

S. 165. The Faculties hereinafter mentioned will be entitled to elect the number of Ordinary Fellows respectively set against their names.

(1)			 	 	 3
(2)	Science Technolog Medicine		 	 	 2
(3)	Technolog	У	 	 	 1
(4)	Medicine		 	 	 2
(5)	Law				 2

S. 166. All the members of the Faculty shall be entitled to vote at this election and shall be the only persons entitled to vote thereat.

(v) Donor-Fellows.

[UNDER SECTION 13, II (C) AND (D) OF THE ACT.]

- S. 167. The University will maintain a list of persons entitled to serve as Fellows of the University under Clause II (C) of Section 13 of the Act. The Registrar shall notify to the person so entitled requesting him to intimate to the University within 10 days of the receipt of such notification from the Registrar whether he intends to serve as a Fellow of the University and on receipt of such intimation by the Registrar, the person so entitled shall be a Fellow of the University for life.
- Section 13 II (D) of the Act, requesting them to intimate to the University, within 15 days of the receipt of such notification from the Registrar, the names, degrees and addresses of their nominees to serve as Fellows of the University and on receipt of such intimation by the Registrar, the person so nominated shall be a Fellow of the University for a period of five years.

CHAPTER XII.—ELECTION TO AUTHORITIES OTHER THAN THE SENATE.

[Under Section 33 (2) (c) of the Act.]

- S. 169. In the case of election to authorities other than the Senate, the Vice-Chancellor, or in his absence from the Bombay Presidency, the Senior Fellow in the Senate shall direct the Registrar to take steps for election.
- Seven clear days before the date fixed by the Registrar as the last day for receiving nominations, the Registrar shall send to every elector a notice of the date of election.
- S. 171. The voting at all elections shall be by ballot.

- S. 172. All elections shall be by the issue by the University of voting papers by post.
- S. 173. In the cases referred to in Statute 172 hereof, the Registrar shall send to each elector a voting paper, an addressed envelope for the same and a certificate of identity to be signed by the elector. The elector shall forward his voting paper unsigned in the envelope provided, under seal, enclosed in a cover containing also the signed certificate of identity to the Registrar, so that it shall arrive not later than the time fixed for the election to take place. The Registrar shall then check the qualification of the elector, and, if correct, shall place the sealed envelope containing the voting paper in a box with others for the inspection of the scrutineers.
- Save as hereinafter provided, the procedure for the election of members of the authorities shall be, as far as possible, in accordance with the procedure prescribed by Chapter X hereof.
- S. 175. The candidates whose names are reported by the Registrar to the Vice-Chancellor under Statute 154 shall be deemed to have been duly elected.

CHAPTER XIII.—ELECTION OF A MUNICIPAL COUNCILLOR BY FELLOWS RESIDENT IN BOMBAY.

- S. 176. The following shall be the procedure for the election of a Municipal Councillor by Fellows resident in Bombay.
- S. 177. The Registrar shall prepare a list of Fellows appearing to be entitled to vote at the election of a Municipal Councillor by the Fellows resident in Bombay, at least four clear weeks before the date fixed for the election. The electoral roll shall be published by causing a printed copy thereof to be affixed for inspection in a conspicuous position at the University Office and copies thereof shall be circulated to all Fellows. The Vice-Chancellor shall have authority to correct the roll by adding, altering or omitting names, if any omission or wrong entries be brought to his notice within a fortnight from the date of the publication of the roll. The Vice-Chancellor's decision in this respect shall be final.
- S. 178. A corrected roll shall be published by causing a printed copy thereof to be affixed for inspection in a conspicuous part of the University Office, and copies thereof shall be circulated to all Fellows whose names appear on the roll.
- S. 179. Ten clear days before the date fixed for the election, the Registrar shall issue to all Fellows entered on the corrected roll a notification stating the date and place of the election.
- S. 180. Candidates for election shall be nominated by a nomination paper, which shall be deposited with the Registrar between 12 noon and 4 p. m. at least four clear days before the date fixed for the election. Each nomination paper shall be signed by two Fellows entitled to vote at the election, as proposer and seconder. Any candidate duly nominated may withdraw his candidature by letter, personally handed to the

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Registrar at least forty-eight hours before the hour fixed for the commencement of the election.

ELECTIONS

- S. 181. In the event of there being only one candidate nominated, the candidate so nominated shall be declared elected. In the event of the number of candidates nominated exceeding one, the Registrar shall, on the following day, issue to each Fellow on the Electoral Roll a copy of the list of nominations.
- S. 182. The election shall take place at the Sir Cowasji Jehangir Hall of the University or such other place in the University premises as may be fixed by the Vice-Chancellor on the day fixed for the election, and shall be conducted by the Registrar.
- S. 183. The election shall be by ballot by means of voting papers, which shall be delivered personally to the electors by the Registrar at the time and place aforesaid. No Fellow shall vote for more than one candidate. At the time of voting each Fellow will place a cross on the right hand side of the ballot paper opposite the name of the candidate for whom he votes, thus (x), and will then fold up the ballot paper, and, without showing the front of the paper to any person, will hand over the paper to the Registrar to be put into the ballot box. If a Fellow votes for more candidates than one or places any mark on the paper by which he may afterwards be identified, his ballot paper will be considered void and will not be counted.
- S. 184. Immediately after 6 p. m., the ballot box shall be opened, and each ballot paper shall be initialled by the Registrar. The votes of all the candidates shall then be scrutinized by the Registrar and any two persons nominated by the Vice-Chancellor, who shall not be candidates for the election, and the number of valid votes given for each candidate shall be ascertained by them. The candidate who secures the highest number of votes shall be declared by the Registrar to be elected.
- S. 184A. If an equality of votes is found on such scrutiny to exist between any two or more candidates and the addition of a vote would entitle any of those candidates to be declared elected, the determination of the candidate to whom such one additional vote shall be deemed to have been given shall be made by lot to be drawn by the Registrar in such manner as he shall then and there determine.
- S. 184B. The result of the election as declared by the Registrar shall be final, and shall be forthwith communicated to the Municipal Commissioner for the City of Bombay.
- S. 184C. The ballot papers shall be preserved by the Registrar for a period of one month from the date of the election and shall thereafter be destroyed by him.
- S. 184D. Wherever the expression "clear weeks" or "clear days" appears in the above Statutes, for the purpose of counting the "weeks" or "days", if the last day happens to be a Sunday or a public holiday, such day shall be excluded.

D. GENERAL PROVISIONS.

CHAPTER XIV .- ADMISSION TO THE UNIVERSITY.

S. 108. Every candidate for admission as a student of the University shall pass such entrance or Matriculation Examination or fulfil such other tests of fitness to be admitted as a student as may be from time to time prescribed by Ordinances and Statutes.

CHAPTER XV.—Admission of Students from other Universities.

A student from another University seeking admission to this University shall apply to the Registrar of this University for a certificate of eligibility, and shall at the same time pay a fee of Rs. 20. Such fee shall not be returned if an eligibility certificate is issued to the applicant. But if no such certificate can be issued by the University for any reason, one-half of the said fee shall be retained by the University and the other half shall be returned. No student from another University shall be admitted to any Institution maintained by or affiliated to the University, except on production of a certificate of eligibility, signed by the Registrar of this University in the following form:—

Certificate of Eligibility.

Provided, however, that the Registrar may issue a provisional certificate of eligibility if he is satisfied that the applicant is prima facie eligible for admission to this University. Such provisional certificate shall entitle a student to admission to this University, at his own risk, and on condition that he obtains a final certificate of eligibility before the close of the academic term in which the student is provisionally admitted to the University.

No student from another University or a Board of Secondary or Intermediate Education or other examining body seeking admission to this University shall be admitted to a College affiliated to this University after the expiry of one month from the date of the commencement of any term.

CHAPTER XVI.—UNIVERSITY TERMS.

0. 83. The University year for the Faculties of Arts, Science, Technology Law and Medicine shall be divided into two terms.

10. 84. The following is the arrangement of terms in each of the Faculties from the 1st of June 1938.

	First	Term	Second	Term	Third Term		
Faculty	Date of Commencement,	Date of Con lusion.	Date of Commencement. Date of Conclusion.		Date of Commencement,	Date of Conclusion.	
Arts	20th June	10th October	10th November	10th March			
Science	Do.	Do.	Do.	Do			
Technology (Excluding Agriculture)	Do.	Do.	Do.	Do.			
Technology [Second year Examination in Science (Agri.)] Technology [First year	25th May	30th September	Jst November	20th February			
Examination in Science (Agri.) and B, Sc. (Agri.)]		30th September	1st November	20th February			
Law	20th June	10th October	10th November	10th March		•••	
Medicine* (for old students)	4th June	26th August	27th August	16th December	14th January	7th April	
Medicine (for new students commencing their studies from June 1939)		10th October	10th November	10th April			

0. 85.

Notwithstanding anything contained in Ordinance 87, the Syndicate shall have the power, whenever they consider it necessary to do so, to shift a College vacation by a period not exceeding two weeks without in any way altering the period of its duration. In such cases, the period added to either term shall be regarded for the purposes of Ordinance 87 as part of the other term which has been reduced.

0. 86.

Terms can be kept only by matriculated students who shall attend for a prescribed number of days at one or more of the Colleges or Institutions recognized by the University.

0. 87.

The following shall be the number of days' attendance necessary for keeping terms:—

Faculty.		First Term	Second Term
Arts (Arts students)	•••	65	65
Science (Science students)	•••	65	65
Technology (Engineering stud	ents)	60	60
Technology (Agricultural stud Arts (Commerce students)			70
Arts (Commerce students)	•••	Three fourths of	Three-fourths of
		the days on	the days on
		which lectures	which lectures
Law		The delivered.	are delivered.
		Do.	Do.

^{*} The Second term in Medicine is inclusive of a vacation from the 8th October to the 4th November.

- When, on account of bona fide illness, or any other reason deemed sufficient by the Syndicate, the total attendance of a student of an affiliated College in any one term falls short of the minimum number of days required by Ordinance 87 by not more than 10 days, it shall be competent to the Principal to permit a candidate in such a case, to add together the attendances kept by him in two consecutive terms in any one class, provided that the total of the attendances kept in the two terms so counted together, amount to the total required for minimum attendances of two terms under Ordinance 87: Provided further, that it shall be competent to the Syndicate to condone the deficiency in attendance, if such deficiency exceeds the minimum number of days required by Ordinance 87 by more than 10 days in any one term, if the total attendances of two terms taken together in the same class amount to the total required for the two terms under Ordinance 87.
- O. 89. For all Colleges in any town that may, in the judgment of the Syndicate, be affected with plague or any other epidemic disease, the operation of Ordinance 87 is suspended as regards the number of days' attendance to be required during any University term, and such attendance is at the discretion of the authorities of the institution to which each student belongs.
- 0. 90. The Principals of Colleges are empowered to excuse attendance to students, who having volunteered under the Indian Auxilliary and Territorial Forces Acts, are unable to attend College during the period they are under training or engaged in other military duties.
- O. 90A. Principals of Colleges are empowered to excuse attendance to students who are required to leave the town, where the College is situated, for the purpose of taking part in sports held under the auspices of the University for the period during which they are unavoidably absent from the College.
- **0. 91.** The Principals and Heads of Institutions shall keep a register of the daily attendance of matriculated students.
- O. 92. To keep a term at a College or recognized Institution, an Undergraduate must complete to the satisfaction of the Principal or the Head of the Institution the course of study at the College or Institution prescribed for such term for the Class to which such Undergraduate then belongs.

CHAPTER XVII.—TRANSFERENCE CERTIFICATE.

[Under Section 35 (1) (0) of the Act.]

- 0. 93. No student shall at any time be admitted to another College unless he produces from the College he leaves—
 - (i) a certificate (called Transference Certificate), showing-
 - (a) the number of days kept at the College which the student has left in all the terms during which he attended the College after passing his last University examination;

- (b) the number of College examinations he did and did not attend with the result of each examination, since the last University examination that he passed;
- (c) *that he has written exercises in English Composition in class to the satisfaction of his teacher;
- (d) that he has no books in his possession belonging to the College he has left;
- (e) that nothing is owing by him for College dues;
- (f) that he bears a good moral character;
- (g) his date of birth as entered in the School Register;
- (h) *the voluntary subject or group of subjects in which he has attended courses of instruction at the College;
- (i) *his Honours group if he is a student of the B. A. Honours class or his Principal subject if he is a student of the B. Sc. class.
- (ii) in the case of a First Year student his laboratory journal certified, by the Head of the College he is leaving, to be a record of work actually done by the student.
- 0. 94. In no case except as provided in Ordinance 97, shall a Transference Certificate be refused, provided the required entries therein can be made.
- **0. 95.** In all questions arising out of clause (f) in the Certificate, the decision of the Syndicate shall be final.
- O. 96. Subject to the provisions of Ordinance 96 A, when a Principal receives an application for a Transference Certificate more than a month after the opening of a term, he may levy a fee of one rupee before issuing the certificate.
- **0. 96A.** When a student applies for a Transference Certificate after the lapse of more than one vacation since he last attended a College, the Principal who issues the Transference Certificate may levy a fee of one rupee for each term that has elapsed since the applicant last attended a College.
- 0. 97. If, as the result of a student leaving one College to join another, it will be necessary for him to count the attendances kept in more than one college to enable him to make up the necessary number of attendances, for his first year in the case of a first year student or for the term in the case of any other student, a Transference Certificate shall not be granted except—
 - (i) in case the parent or guardian with whom the student has been residing is transferred to another district;

^{*} To be struck out where it is not applicable.

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99.

0. 101.

0. 102.

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- (ii) when a change of air for the improvement of the student's health has been recommended by a recognized Medical Practitioner;
- (iii) for other reasons* which appear to the Syndicate to be sufficient.
- 98. Applications for Transference Certificates shall be made by students without unnecessary delay through the Principal of the College to which they wish to be transferred.

CHAPTER XVIII.—INSPECTION OF COLLEGES.

[Under Section 35 (1) (r) of the Act.]

- The Syndicate shall cause every affiliated College to be inspected from time to time by one or more competent persons authorized by the Syndicate in this behalf.
- O. 100. An inspection of every affiliated College shall be held under Section 41, sub-section (2) of the Act at least once in three years and at other times when, in the judgment of the Syndicate, special reasons exist in the case of any College for such inspection.
 - The inspection will be directed primarily to the purpose of ascertaining if the main conditions of affiliation are maintained or not, and of seeing that adequate measures are taken to ensure efficiency.
 - If the report submitted by the person deputed to inspect calls for any action by the Syndicate, the Syndicate shall, after full inquiry, specify definitely the point or points in which it considers the College deficient and fix a time to be extended (upon good cause shown) within which the College shall take the action necessary to rectify the deficiencies pointed out.

CHAPTER XIX—RETURNS.

[Under Section 35 (1) (r) of the Act.]

- Every College shall submit annually by the 15th April to the Syndicate the following returns in the forms prescribed in the University Calendar.—
 - (a) A return of the teaching staff.
 - (b) Return of finances, giving the accounts for the preceding Government financial year.
 - (c) Return of the number of students attending the College.
- Every College shall report to the Syndicate all changes in its teaching staff as soon as such changes are made. In the case of Medical Colleges they shall also report the changes in the staff of the Hospitals where the students of these Colleges are required to do their clinical work. In reporting such changes the qualifications of the members of the staff newly appointed, the conditions governing

^{*}The Syndicate have ruled that when a town in which a College is situated is declared infected with plague or other epidemic disease, a student who desires to join another College may do so under the provisions of this clause.

their tenure of office and the qualifications of the persons in whose place the new appointments are made shall be given in detail.

CHAPTER XX.—REGISTERS.

[Under Section 35 (1) (s) of the Act.]

- 0. 104. Every College shall maintain—
 - (a) a Register giving, for every student who has been admitted to the College, the date of admission, date of birth, name of birth-place, attendance at College examinations and results of such examinations, and a record of University career and the date of withdrawal;
 - (b) a Register of daily attendance of each student.

CHAPTER XXI.—HOSTELS AND THEIR RECOGNITION.

[Under Section 35 (1) (d) of the Act.]

- O. 105. Every Hostel maintained or managed by the University or by a College affiliated to the University shall, *ipso facto*, be a recognized Hostel.
- O. 106. Any person or a body of persons managing or maintaining a Hostel desirous of having it recognized by the University shall apply to the Syndicate for recognition with the following particulars:—
 - (i) The locality of the Hostel and its surroundings.
 - (ii) The capacity of the Hostel and the approximate floorspace provided for each inmate.
 - (iii) The number of students expected to be put in each room.
 - (iv) Arrangements made for water supply, lighting, sanitation, medical help, etc., in the Hostel.
 - (v) Arrangements made for the boarding and for outdoor and indoor games.
 - (vi) Arrangements made for the inspection of the kitchen, for the superintendence over the inmates, and for the management of the Hostel.
 - (vii) The financial statement relating to the Hostel.
- O. 107.

 On receipt of an application, the Syndicate, after any further inquiry which it may deem necessary, shall decide as to whether or not the recognition is to be granted. Provisional recognition may, however, be granted by the Syndicate on such conditions as it may deem necessary.
- O. 108. The Syndicate may suspend or withdraw the recognition granted to a Hostel managed by a person or body of persons which is not conducted according to the conditions of recognition: Provided that no action shall be taken without giving the management of the Hostel concerned an opportunity of making such representation in the matter as it may desire to make.

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CONFERMENT OF DEGREES, ETC.

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0. 109.

The Syndicate may hold periodical inspections of all Hostels by persons appointed for the purpose.

0. 110.

The management of every Hostel shall submit to the Syndicate at the end of every term a report of the working of the Hostel for the term.

CHAPTER XXII.—RESIDENCE OF STUDENTS.

[Under Section 35 (1) (f) of the Act.]

- O. 111. Each College shall provide residential quarters for such a percentage of its students as the Syndicate may from time to time decide, and shall make arrangement for the supervision over the rest of the students who do not live with their guardians or parents.
- O. 112. Students who do not live in recognized Hostels or with their parents or guardians shall live in lodgings approved by the authorities of the College to which they belong, and shall be subject to the control of the authorities of the College appointed for the purpose.

CHAPTER XXIII.—CONVOCATION.

S. 110. A Convocation for conferring Degrees shall be held ordinarily on the third Tuesday in August, and on such other graduation day as may be appointed by the Chancellor or the Vice-Chancellor.

CHAPTER XXIV.—PRECEDENCE.

The Chancellor, the Vice-Chancellor, Ex-Vice-Chancellors who are Fellows, the Director of Public Instruction, the Deans of the Faculties of Arts, Science, Technology, Law and Medicine, the Syndics, and Fellows of the University, shall have seniority and precedence, first in the order above specified down to the Syndics, and, secondly, according to their official precedence in the case of ex-officio Fellows, and, thirdly, in the case of other Fellows according to the sequence of their original appointments.

CHAPTER XXV.—CONFERMENT OF DEGREES, ETC.

[Under Section 29 of the Act.]

S. 111. The Senate shall confer upon persons who have fulfilled the requirements of the Act, Statutes, Ordinances and Regulations for the time being in force such Degrees and award such Diplomas as are provided for in Statute 112.

The Senate shall also have the power to confer those degrees or diplomas for which qualifying examinations were held by the University at different times, since its first incorporation in 1857, upon persons who have passed those examinations, and have been declared qualified to receive those degrees or diplomas.

5. 112. The Senate will, on the motion of the Dean of each Faculty or in his absence, the Senior Member of the Faculty, respectively pass the necessary graces in that behalf; the persons so approved

shall be presented to the Chancellor or the Vice-Chancellor successively in the following order:-

In the Faculty of Arts:

- Bachelor of Arts, 1.
- Bachelor of Commerce,
- 3. Bachelor of Teaching,
- 4. Master of Arts,
- 5. Master of Commerce,
- 6. Master of Education,
- 7. Doctor of Letters,

In the Faculty of Science:

- Bachelor of Science, 8.
- Master of Science,

In the Faculty of Technology:

- Bachelor of Agriculture, 10.
- Bachelor of Science (Agri.), 11.
- 12. Bachelor of Engineering,
- Bachelor of Science (Tech.), 13.
- Master of Agriculture, 14.
- 15. Master of Science (Agri.),
- Master of Engineering, 16.
- Master of Science (Tech.), 17.

In the Faculty of Law:

- 18. Bachelor of Laws,
- 19. Master of Laws.

In the Faculty of Medicine:

- Bachelor of Medicine & Bachelor of Surgery, 20.
- 21. Diploma in Public Health,
- 22. Diploma in Ophthalmology,
- 23. Doctor of Hygiene,
- Doctor of Medicine, 24.
- Master of Surgery. 25.

In various Faculties:

- Doctor of Philosophy, 26.
- Doctor of Science. 27.
- S. 113. In special cases, and, at the discretion of the Syndicate, candidates, who have passed the examinations may be permitted to take their Degree in absentia.
- Every person who passes an examination for a degree or diploma 0. 113. of the University shall be eligible, on payment of a fee of Rs. 15 on his first graduation in this University, and of Rs. 10 on his second or subsequent graduation to be admitted to the respective degree or diploma in person or in absentia at his option, and in testimony thereof a diploma shall be awarded to him.

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ACADEMIC COSTUME

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CHAPTER XXVI.—ACADEMIC COSTUME.

- 0. 114. Academic Costume is worn at Convocations for conferring Degrees.
- Such of the Fellows of the University of Bombay as are graduates of other Universities, or as are entitled to wear official costume or uniform, may appear in the academic dress of their own Universities, or in such costume or uniform, wearing in addition the Fellow's Scarf of the University of Bombay.
- Other Fellows shall wear the Fellow's Gown and Scarf of the University of Bombay. The Head-dress of the European Fellows is a College Cap.

Academic Costume to be worn by the members of the Senate and Graduates of the University of Bombay.

CHANCELLOR.

Gown.—Black damask silk with gold lace and tufts. Cap.—Black velvet Academic Cap with gold tassel.

VICE-CHANCELLOR.

Gown.—The same, but with silver lace and tufts. Cap.—The same, but with silver tassel.

REGISTRAR.

Gown.—The same, but with black silk lace and tufts. Cap.—Black cloth Academic Cap, with black silk tassel.

FELLOWS.

Gown.—Bishop's purple silk, with full sleeves. Scarf.—Of the same colour, with goldfringed ends.

GRADUATES.

B. A.

Gown.-Black silk or stuff.

Hood.—Black silk, bound with garter blue silk, one inch wide.

M. A.

Gown.-Black silk or stuff.

Hoop.—Garter blue silk lined the same.

B. Com.

Gown.-Black silk or stuff.

Hoop.—Black silk, bound with violet silk, one inch wide.

M. Com.

Gown.-Black silk or stuff.

Hood.—Black silk lined with violet silk.

D. LITT.

Gown—Crimson silk with black facings. Hood.—Crimson silk lined with black.

B. T.

Gown.-Black silk or stuff.

Hood.—Black silk, bound with rose coloured silk, two inches wide.

M. Ed.

Gown-Black silk or stuff.

Hood-Black silk, bound with rose coloured silk, two inches wide.

B. Sc.

Gown .- Black silk or stuff.

Hood.—Black silk, bound with yellow silk, one inch wide.

M. Sc.

Gown.-Black silk or stuff.

Hood.—Black silk lined with yellow silk.

B. Ag. and B. Sc. (Agri.)

Gown.-Black silk or stuff.

Hood.—Black silk, bound with green silk, one inch wide.

M. Ag.

Gown .- Black silk or stuff.

Hood.—Black silk, lined with green silk.

M. Sc. (AGRI.)

Gown-Black silk or stuff.

Hood—Black silk, lined with green silk.

B. E.

Gown.—Black silk, or stuff.

Hood.—Black silk, bound with brown silk, one inch wide.

B. Sc. (Tech.)

Gown.-Black silk or stuff.

Hoon.—Black silk, bound with orange silk, one inch wide.

M. Sc. (Tech.)

Gown-Black silk or stuff.

Hood-Black silk, lined with orange silk.

M. E.

Gown.-Black silk or stuff.

Hood.—Brown silk, lined with garter blue.

PH. D.

Gown.—Black silk or stuff.

Hoop.—Claret-coloured silk, lined with the colours of the respective Faculties as under:—

Arts Faculty
Science Faculty
Technology Faculty
Law Faculty
Medicine Faculty

Arts Faculty
Sgarter blue,
yellow,
orange,
scarlet,
crimson.

D. Sc.

Gown.—Crimson silk with yellow facings. Hoop.—Crimson silk lined with yellow.

LL. B.

Gown.-Black silk or stuff.

Hood.—Black silk with scarlet cloth band inside, two inches wide.

LL. M.

Gown.-Black silk or stuff.

Hood.—Scarlet cloth lined with scarlet silk.

M. B., B. S. AND D. O.

Gown.-Black silk, or stuff.

Hood.—Black silk, lined with crimson silk.

B. Hy.

Gown.-Black silk or stuff.

Hood.—Black silk, lined with white silk, one inch wide.

D. Hy.

Gown.—Undress, black silk or stuff.

Full dress, crimson silk, white silk facings.

Hood.—Crimson silk, lined with white silk.

M. D. AND M. S.

Gown.—Undress, black silk or stuff.

Full dress, crimson silk, grater blue facings.

Hood.—Crimson silk, lined garter blue.

HONORARY DEGREE OF LL. D.

Gown.—Crimson silk, with white cloth facings.

Hood.—Scarlet silk, lined with white silk.

CAP.—For all European Fellows or Graduates—

Black cloth Academic Cap with black silk tassel.

CHAPTER XXVII-REGISTRATION OF GRADUATES.

- S. 114.

 (1) The name of every graduate of this University in any Faculty will, on his first graduation in this University, be entered on the Register of Graduates. All persons whose names are so entered shall be entitled to vote at the election of Fellows in accordance with Statutes framed from time to time in that behalf.
 - (2) Graduates of this University whose names are not on the Register of Graduates shall be entitled to have their names entered on the said Register on payment of such registration fee as may be prescribed by the Syndicate from time to time, and they shall be entitled to vote at the election of Fellows in accordance with Statutes framed from time to time in that behalf.

[Statutes 115, 116 and 117 have been deleted.]

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S. 118. Graduates wishing to have their names registered shall fill in a printed form to be supplied on application to the Registrar.

• S. 119. Registered graduates shall notify to the Registrar every change of their address.

0. 116A. The fee for the Registration of graduates under Statute 114 (2) shall be Rs. 5.

CHAPTER XXVIII.—PROVIDENT FUND. (UNDER SECTION 50 OF THE ACT.)

- S. 120. (a) Every whole-time officer, teacher or other servant of the University, except one whose services have been lent to the University by Government, appointed on or after the 1st April, 1925, to a substantive appointment, carrying a salary of rupees thirty or upwards per mensem shall, as a condition of his service, become a subscriber to the University Provident Fund.
 - (b) Notwithstanding anything in these Statutes, the admission of any officer, teacher or other servant of the University, who was first appointed before the 1st day of April 1925, to the benefits of the University Provident Fund, and all contributions made by the University to the credit of such officer, teacher or servant shall be deemed to have been validly made, and such officer, teacher or servant shall be deemed to have become a subscriber to the University Provident Fund from the date of his first admission to the benefits thereof.
 - (c) Any whole-time officer, teacher or other servant of the University temporarily appointed in the first instance and subsequently confirmed in the same appointment may, by a resolution of the Syndicate, be admitted to the benefits of the University Provident Fund from the date of his temporary appointment, provided that there has been no break or interval between the termination of the temporary appointment and the commencement of the permanent appointment.
 - (d) The Syndicate shall also have power to permit any wholetime officer, teacher or other servant of the University in pensionable service to become a voluntary subscriber to the University Provident Fund, provided, however, that he shall not be entitled to receive any contribution from the University, but shall be entitled to receive on the amount of his subscription, interest at such rate as may be fixed by the Syndicate from time to time. Such a subscriber shall be subject to all the other provisions relating to the Provident Fund mutatis mutandis.
- Subscriptions to the Fund shall be at one uniform rate of one-sixteenth of the salary of the subscriber. In the case of a servant of the University employed under a specific agreement, the rate shall be provided for in the agreement, and shall not exceed six and one-fourth per cent of the salary. Such subscription shall be deducted monthly from the salary of the subscriber, and the amount so deducted shall be paid to the University Provident Fund to the credit of the subscriber. An officer, teacher or other servant on leave of any kind may, with the permission of the

Syndicate, discontinue his subscriptions to the Provident Fund, or pay them at such rate, not exceeding the uniform rate, as may be determined by the Syndicate.

- S. 122. The University's contribution to the Fund shall be equal to the subscriber's subscription, and shall be made yearly on the 30th day of June.
- When the amount standing in the Fund to the credit of a subscriber who has been dismissed from the service of the University for misconduct becomes payable, the Syndicate may direct that the whole or any part of the contributions of the University, and of any interest accrued thereon, be deducted from the amount standing to the credit of the subscriber and be paid to the University.
- When the amount standing in the Fund to the credit of a subscriber becomes payable, the Syndicate may direct that any amount due under a liability, incurred by the subscriber to the University up to the total amount of the contributions paid by the University, with interest thereon, be deducted from the amount standing to the credit of the subscriber, and be paid to the University.
- When the amount standing in the Fund to the credit of a subscriber who has resigned his service in the University before completing three years becomes payable, the Syndicate may direct that the whole or any part of the contributions of the University, and of any interest accrued thereon, be deducted from the amount standing to the credit of that subscriber, and be paid to the University.
- S. 125. Payments from the Fund—Subject to any deductions under Statutes 122A, 123, 124 and 125B, the amount standing in the Fund to the credit of a subscriber shall become payable:—
 - (a) on the death of the subscriber before quitting the service or (b) on the suscriber's ceasing to be in the service of the University.

For the purpose of this Statute, an officer, teacher or other servant of the University, who holds office for a fixed period of time shall, on re-appointment to the same or another office in the University, immediately on expiry of the said period, be deemed to have been in the service of the University continuously from the date of his first appointment.

- S. 125A. A subscriber's account shall be closed:—
 on the day after the date of his death; or
 - (b) from the day on which he ceases to be in the service of the University.

No contribution or interest shall be credited in respect of any period after the date on which the account is closed.

Loans to subscribers—Advances from the amount standing to the credit of a subscriber on account of his own subscription may at the discretion of the Syndicate be granted to him in the case of the illness of the subscriber or of members of his family or any other reason deemed sufficient by the Syndicate. Such loans shall be repaid at a rate of interest and in a number of instalments to be fixed by the Syndicate in each case.

S. 125C.

Declarations and Withdrawal—Each subscriber on joining the Fund shall furnish a nomination in Form A*, showing how he wishes the amount to his credit in the Fund to be disposed of on his death provided that if he has a family, or at any time after joining the Fund acquires a family, he shall be precluded from nominating a person who is not a member thereof. Such nomination may at any time be revoked by the subscriber and/or replaced by a fresh nomination. A nomination shall be operative only on being received by the University.

S. 125D.

Subject to any deductions under Statutes 122A, 123, 124 and 125B, on the death of a subscriber before quitting the service—

- (i) when the subscriber leaves a family—
 - (a) if a nomination made by the subscriber in accordance with the provisions of Statute 125C in favour of a member or members of his family subsists, the amount standing to his credit in the Fund, or the part thereof to which the nomination relates, shall become payable to his nominee or nominees in the proportion specified in the nomination;
 - (b) if no such nomination in favour of a member or members of the family of the subscriber subsists or if such nomination relates only to a part of the amount standing to his credit in the Fund, the whole amount or the part thereof to which the nomination does not relate, as the case may be, shall, notwithstanding any nomination purporting to be in favour of any person or persons other than a member or members of his family, become payable to the members of his family in equal shares;

Note.—Any sum payable under these rules to a member of the family of a subscriber vests in such member under sub-section (2) of section 3 of the Provident Funds Act, 1925.

* FORM A. Form of Declaration.

I hereby declare that I wish, in the event of my death, the amount at my credit in the University of Bombay Provident Fund to be distributed among the persons mentioned below in the manner shown against their names:—

Name and address of the nominee or nominees.	Relationship, if any with the subscriber. 2	Whether major or minor; if minor, state the age.	Amount of share of deposit.

Two Witnesses to Signature.

Station. Signature of Subscriber.

Date.

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(ii) when the subscriber leaves no family, if a nomination made by him in accordance with the provisions of Statute 125C in favour of any person or persons subsists, the amount standing to his credit in the Fund or the part thereof to which the nomination relates shall become payable to his nominee or nominees in the proportion specified in the nomination.

Note 1.—When a nominee is a dependant of the subscriber as defined in clause (c) of section 2 of the Provident Funds Act, 1925, the amount vests in such nominee under sub-section (2) of section 3 of that Act.

Note 2.—When the subscriber leaves no family and no nomination made by him in accordance with the provisions of Statute 125C subsists, or if such nomination relates only to part of the amount standing to his credit in the Fund, the relevant provisions of clause (b) and of sub-clause (ii) of clause (c) of sub-section (1) of section 4 of the Provident Funds Act, 1925, are applicable to the whole amount or the part thereof to which the nomination does not relate.

- S. 125E. For the purposes of Statutes 125C and 125D only the following persons shall be held to constitute a subscriber's family, viz., his wife or wives and children and the widow or widows and children of a deceased son.
- Every subscriber shall be bound by these rules and shall sign an S. 125F. agreement in Form B.*
- The Syndicate may, from time to time, make Ordinances or issue S. 125G. such general or special directions as are consistent with the above Statutes as to
 - the conduct of the business of the Fund: (a)
 - any matter relating to the Fund, or its management, or the investment of sums at the credit of the Fund, or the privileges of the depositors not herein expressly provided for;

vary or cancel any rules made or directions given by them.

*FORM B. Form of Agreement.

I hereby declare that I have read the University of Bombay Provident Fund Rules and that I agree to be bound by them. 19 at Dated day of Name in full Date of birth Date of joining appointment Nature of appointment Rupees Salary per mensem Signature Address Witness Name Occupation Address Name Witness

Occupation

Ordinances made under Statute 125 G.

- O. 117. The amount in hand to the credit of the Fund shall be invested in Government securities or be placed on fixed deposit in the Imperial Bank of India or in the Post Office Savings Bank, according as the Syndicate may direct.
- 0.118. The Syndicate shall cause to be maintained proper accounts relating to the Fund showing the amount for the time being to the credit of each depositor and the general state of the Fund, in such form as it may from time to time prescribe.
- O. 119. The interest received by the University on sums so invested shall as soon as received be added to the amounts standing to the credit of the Fund.
- 0. 120.

 Interest at 4½ per cent. per annum credited yearly on 30th June will be allowed on the amount standing to the credit of each depositor on the 30th June and 31st December, respectively, in each year, subject to the right of the Syndicate to revise the rate at any time (after announcing its intention of doing so) owing to a change in the rate of interest in the Government securities or for any other sufficient reason.
- 0. 121. The term 'salary' shall include personal allowances, but shall not include any acting or other allowance.
- O. 121A. The amount withdrawn by any depositor together with such interest as would have accrued on the sum had it not been withdrawn, shall be recovered by such number of monthly instalments not exceeding twenty-four as the Vice-Chancellor may fix, and shall be recovered by deductions from the salary paid by the University to the Depositor. The first of such deductions shall be made from the first payment of a full month's salary after the Depositor has withdrawn the sum to be refunded. The amount of such instalments shall be fixed in round numbers and the last instalment shall cover the entire balance then to be refunded by the depositor. But a depositor may at his option pay any additional sum above the amount of the instalment fixed in round figures: Provided, however, that the interest due may be recovered in two further instalments.

CHAPTER XXIX.—RECOGNIZED UNIVERSITIES.

- O. 123. The Universities recognized are the Universities of Great Britain and Ireland, of India* and the Hong-Kong University in all the Faculties in which Degrees are granted by them respectively.
 - CHAPTER XXX.—AFFILIATED COLLEGES.
- S. 185. For the purposes of Section 13 (Explanation 1) of the Bombay University Act of 1928, the Schools and Colleges in the Indian States and other territories within the territorial limits of the University shall be attached to different groups as shown below.

^{*}By the expression "Universities of India" is meant all the Statutory Indian Universities and the University of Mysore. The following is a list of Statutory Universities in India:—Calcutta, Bombay, Madras, Punjab, Allahabad, Benares (Hindu), Patna, Dacca, Aligarh (Muslim), Rangoon, Lucknow, Delhi, Nagpur, Andhra, Agra and Annamalai.

Gujarat Group.

- (1) States in the Western India States Agency.
- (2) States in the Rajputana Agency.
- (3) States and Thana circles in the Gujarat States Agency and the Baroda Residency, excepting the State of Jawhar.

Konkan Group.

State of Murud-Janjira, Sawantwadi and Jawhar.

Deccan Group.

States in Deccan States Agency and Kolhapur Residency excepting the States of Murud-Janjira, Sawantwadi, Jath, Savanur and Wadi Estate.

Karnatak Group.

- (1) Goa.
- (2) States of Jath, Savanur and the Wadi Estate.

Sind Group.

Indian States in the Punjab Agency.

(Statutes 186 and 194 to 198 have been deleted.)
(Ordinances 124 to 131 have been deleted.)

The following are the affiliated Colleges falling in the various groups specified in Section 13 of the Act.

Gujarat Group.

(a) British India.

- 1. Gujarat College and Madhavlal Ranchhodlal Science Institute, Ahmedabad (1879).—In Arts for the purposes of the Examinations for the B.A. degree; in Science for the Intermediate Science Examination in groups of "Mathematics, Physics and Chemistry" and "Physics, Chemistry, and Biology" and for the B. Sc. Examination in groups of "Physics and Chemistry," "Mathematics and Physics" and "Chemistry and Botany" and "Botany (Principal) and Zoology (Subsidiary)."
- 2. Maganlal Thakordas Balmukundas College, Surat (1918).—
 In Arts, teaching up to the standard of the Pass Examination for the B. A. Degree in English, Sanskrit, Persian, Gujarati, Urdu, Arabic, History and Economics, Philosophy, Mathematics, Physics and Chemistry and the Honours Examination in English, Sanskrit, Arabic, Persian, Urdu, Gujarati, Mathematics, History and Economics, and Physics and Chemistry subject to a maximum of 600 students in the first year, 250 in the second year, 250 in the third and fourth year classes. In Science permanently for the Intermediate Science Examination in Groups A and B, and for teaching the B. Sc. course (Principal &

Subsidiary) in Mathematics, Physics & Chemistry, subject to the maximum number of admissions as shown below:

I. Sc. 'A' \ I. Sc. 'B' \	150	I. Sc. Group 'B'	86
J. B. Sc. (Subsidiary) & B. A. Physics	72	Senior B. Sc. (Physics)	25
Do. (Chemistry)	64	(Chemistry)	40

- 3. Sir Lallubhai Shah Law College Ahmedabad (1927).—In Law for teaching the LL. B. course provisionally for a period of three years from June 1938.
- 4. Sarvajanik Law College, Surat (1935).—In Law provisionally for three years from June 1937 subject to a maximum of 75 students in the first LL. B. class and 50 in the second LL. B. class.
- 5. Hargovandas Lakhmichand College of Commerce, Ahmedabad (1936).—In Arts for a period of three years only with effect from the academic year 1936-37, in courses of instruction (a) for the Intermediate Commerce Examination and (b) for the B. Com. Examination in all the compulsory subjects and in the following optional subjects: Advanced Accounting & Auditing, Advanced Banking, and Organization of Cotton Industry subject to limitation of numbers of admissions as shown below:—

F. Y. Com.	150 (from 1938).
I. Com.	150
B. Com.	120

6. Seth Lalbhai Dalpatbhai Arts College, Ahmedabad (1937).—
In Arts, provisionally for 3 years from 1937, for teaching courses of study leading to the degree of B. A., Pass and Honours in English, Sanskrit, Ardha-Magadhi, Gujarati, History & Economics, Philosophy and Mathematics, for Pass in French, Persian, subject to the maximum number of admissions, as shown below:—

F. Y. Arts.	150
Inter-Arts.	75
Jr. B. A.	50
Sr. B. A.	50

(b) Indian States

- 7. Baroda College, Baroda (1881).—In Arts, excluding the B. Com. and B. T. Degrees; in Science for the purposes of the Examinations leading up to the B. Sc. Degree.
- 8. Bahauddin College, Junagadh (1901).—In Arts, excluding the B. Com. and B. T. Degrees. In Science provisionally for 3 years from June 1937, for teaching the courses of study leading to the Intermediate Science Examination, subject to the maximum of 64 students in the First Year Science class, and 64 students in the Intermediate Science class of whom not more than 32 shall be in the Biology group.
- 9. Samaldas College, Bhavnagar (1885).—In Arts, for the purposes of the Examinations leading up to the B. A. Degree. In Science, for the Intermediate Science courses in Groups A and B subject to a maximum of 90 students in Groups A and B taken together and 30 only in Group B.

10. Dharmendrasinhji College, Rajkot (1937).—In Arts and Science, provisionally for three years from 1937, for teaching up to the Intermediate Arts and Science examinations, subject to the maximum number of admissions as shown below:—

F. Y. Arts. 90 F. Y. Science 50 Inter Arts. 65

Inter Science 36, of whom not more than 16 shall be in Biology group.

11. Baroda Training College, Baroda (1938).—In Arts, provisionally for two years from June 1938, for teaching the B. T. Degree examination course, subject to the maximum of 50 students.

Konkan Group.

- 1. Elphinstone College, Bombay (1860).—In Arts, excluding the B. Com. and B. T. Degrees; in Science, for the purposes of the Examinations leading up to the B. Sc. Degree.
- 2. Wilson College, Bombay (1861).—In Arts, excluding the B. Com. and B. T. Degrees; in Science, for the purposes of the Examinations leading up to the B. Sc. Degree.
- 3. St. Xavier's College, Bombay (1869).—In Ar's, excluding the B. Com. and B. T. Degrees; in Science for the purposes of the Examinations leading up to the B. Sc. Degree.
- 4. Hansraj Pragji Thackersey Arts College, Nasik (1924).—In Arts, teaching up to the standard of the B. A. Degree for both Pass and Honours courses in English, Sanskrit, Marathi, and Economics, and for the Pass course in Gujarati, History and Philosophy. The College is authorized to admit a maximum of 150 first year students, 100 second year students and 100 third and fourth year students taken together.
- 5. Secondary Training College, Bombay (1922).—In Arts, for the Examination for the Degree of Bachelor of Teaching.
- 6. Sydenham College of Commerce and Economics, Bombay (1914).—In Arts, for the purposes of all Examinations in Commerce.
- 7. Royal Institute of Science, Bombay (1926).—In Science, permanently from June 1938, for teaching the courses of study for the last two years in Science leading to the B. Sc. Degree examination (both Principal and Subsidiary) in Mathematics, Physics, Chemistry, Botany and Zoology.
 - 8. Government Law College, Bombay (1860).—In Law.
- 9. Grant Medical College, Bombay (1860).—In Medicine, and in Science for the purposes of the Final B. Sc. Examination only.
- 10. Seth Gordhandas Sunderdas Medical College, Bombay (1925).—In Medicine, for the purposes of all the Examinations for the M. B., B. S. Degrees, and also for postgraduate Medical Degrees, and Diplomas, subject to the condition that the number of fresh students to be admitted to the First Year class should not exceed 80 annually: in Science, for the B. Sc. course in Human Anatomy and Embryology permanently from April 1937, subject to the maximum of 16 students (8 junior and 8 senior) in the class, and permanently for the B. Sc.

courses in Animal Physiology (Principal and Subsidiary), Microbiology (Subsidiary) and Microbiology (Principal) with Group III (I) only.

- 11. Ismail College, Andheri (1930).— In Arts, for teaching up to the B. A. standard, with a maximum of 90, 85 and 120 students in the First Year Arts, the Intermediate Arts and the B. A. classes respectively, for Honours courses in English, Persian, Arabic, Urdu, History and Economics and Pass courses in Sanskrit, Mathematics and Philosophy. In Science, provisionally for three years from June 1936 for the Intermediate Science course, Groups A and B, subject to a maximum of 80 students in the First Year Science class, 64 students in the Intermediate Science class, Groups A and B taken together, of whom not more than 32 shall be in Group B.
- 12. Ramnarain Ruia College, Dadar-Bombay (1937).—In Arts and Science, provisionally for three years from 1937, for teaching up to the Intermediate Arts & Science Examinations, with a maximum of 200, 150, 125, and 100 students in F. Y. Arts, F. Y. Science, Intermediate Arts & Intermediate Science classes, respectively. Provisionally for 2 years from June 1938 for teaching B. A. (Hons. & Pass) in English, Sanskrit, Marathi, Gujarati & Economics, B. A. Pass in Mathematics, History, Philosophy & French; for B. Sc. Principal & Subsidiary in Chemistry and B. Sc. Subsidiary in Physics & Zoology.
- 13. Khalsa College, Matunga-Bombay (1937).—In Arts & Science, provisionally for three years from 1937, for teaching up to Intermediate Arts & Science Examinations, with a maximum of 150, 100, 125 and 75 students in the F. Y. Arts, F. Y. Science, Inter Arts & Inter Science classes, respectively. Provisionally for 2 years, from 1938, for teaching B. A. Pass and Honours courses in English, French, Economics, Mathematics, Sanskrit, Persian, Gujarati & Marathi, and Pass course in Philosophy, & History & Economics, with a maximum of 150 students in the junior & senior B. A. classes, taken together,

Deccan Group. a) British India.

- 1. Fergusson College, Poona (1884).—In Arts, excluding the B. Com. and B. T. Degrees; in Science, for the purposes of the Examinations leading up to the B. Sc. Degree.
- 2. Sir Parashurambhau College, Poona (1916).—In Arts, teaching upto the standard of the B. A. Degree both Pass and Honours courses in English, Sanskrit, Marathi, Mathematics, Physics and Chemistry, History and Economics and Philosophy, in French and Ardha-Magadhi. In Science for the Intermediate Science Examination in Groups A and B, and for the B. Sc. (Principal and Subsidiary) Examination in Mathematics, Physics and Chemistry, subject to a maximum of 85 students in the B. Sc. classes.
- 3. Nowrosjee Wadia College, Poona (1932).—In Arts, permanently from June 1937 upto the B. A. Pass and Honours Examinations in English, Sanskrit, Marathi, Ardha-Magadhi, French, German, Persian, Urdu, Philosophy, History and Economics, Mathematics and in Science up to the Intermediate Science Examination in Groups A and B, subject to the maximum of 300 students in F. Y. A., 200 in Inter. Arts, 300 in B. A., 150 in First Year Science, and 150 in Inter. Science, of whom not more than 80 shall be in Group B.

4. College of Agriculture, Poona (1907).—In Technology, for the purposes of the Examinations leading up to the Degree of B. Sc. (Agri).

5. College of Engineering, Poona (1865).—In Technology, for the purposes of the Examinations leading up to the Degree of B. E. (Civil and Mechanical), the number of students to be admitted being subject to 30 in Civil and 20 in Mechanical; and provisionally for a period of five years from June 1935 for teaching the courses of study leading to the degree of B. E. (Electrical) subject to the maximum of 20 students.

6. Indian Law Society's Law College, Poona (1924).—In Law for teaching the courses of study leading to the LL. B. Degree examination.

7. Willingdon College, Sangli (1919).—In Arts, teaching up to the standard of the B. A. Degree for Honours courses in English, Sanskrit, Marathi, Kannada, Ardha-Magadhi, Mathematics, History and Economics, and Philosophy, subject to a maximum of 300 first year, 200 second year, 100 third year and 100 fourth year students. In Science, for the Intermediate Science Examination in Group A and in Group B, subject to a maximum of 24 out of 64 Students in Groups A and B taken together.

(b) Indian States

8. Rajaram College, Kolhapur (1880).—In Arts, teaching up to the standard of the B. A. Degree for the Pass course in Urdu, and for the Pass and Honours courses in English, Sanskrit, Ardha-Magadhi, Persian, Marathi, Kannada, Mathematics, History and Economics, Philosophy, Physics and Chemistry* and Botany and Zoology*; the maximum number of students allowed in the first, second, third and fourth year classes is 375, 200, and 240 respectively. In Science provisionally for a period of five years from June 1934, for the Intermediate Science Examination in Groups A and B., subject to a maximum of 75 students of whom not more than 40 should be admitted in Group B and for the B. Sc. Subsidiary course in Zoology† and Principal and Subsidiary courses in Chemistry, Mathematics, Physics and Botany.†

9. Sykes Law College, Kolhapur (1933).—In Law, provisionally for 3 years from June 1938, for teaching the courses of study leading to the LL. B. Degree examination subject to the admission of 150 students to the first LL. B. class and 100 students to the Second LL. B. class.

10. Shri Maharani Tarabai Teachers' Training College, Kolhapur (1934).—In Arts, for B. T. Degree. Provisionally affiliated for a further period of 5 years from June 1937, subject to a maximum of 100 students.

Karnatak Group.

1. Karnatak College, Dharwar (1917).—In Arts, teaching up to the standard of the B. A. Degree for both Pass and Honours courses in Sanskrit, Kannada, Persian, Mathematics, History and Economics, and Philosophy and for the Pass course in Pali and Urdu, subject to a maximum of 250 students in the first year class, 150 in the second year class and 250 in the third and fourth year classes

^{*} Provisionally up to June, 1939.

[†]Subject to limitation of numbers of admissions to the different courses as laid down in the report of the Local Inquiry Committee dated the 24th February, 1934.

taken together. In Science, for the Intermediate Science Examination in Groups A and B, subject to a maximum of 60 students in Group A and 40 in Group B and for a period of five years from June, 1934 for the B. Sc. Examination* in Chemistry (Principal and Subsidiary), Physics (Subsidiary), Zoology (Principal and Subsidiary), Botany (Subsidiary) and Mathematics (Principal and Subsidiary).

2. Lingaraj College, Belgaum (1933).—In Arts up to the B. A. Degree Examination provisionally for a furthur period of 5 years from June 1938, subject to a maximum of 150 in the First Year Arts, 150 in the Intermediate Arts and 150 in the B. A. (Junior & Senior) classes, for the teaching of the B. A. (Pass and Honours) courses in English, Sanskrit, Kannada, Ardha-Magadhi, History, Mathematics, Philosophy & Economics and B. A. Pass course in History, Marathi and Portuguese. In Science up to the Intermediate Science examination, provisionally for a period of 5 years from June 1938 subject to a maximum of 100 students in the First Year Science class, and 96 students in the Inter. Sc. Groups A & B taken together, of whom not more than 45 in Group B only.

Sind Group.

- 1. Dayaram Jethmal Sind College, Karachi (1887).—In Arts, excluding the B. Com. and B. T. Degrees; in Science, for the purposes of Examinations leading up to the B. Sc. Degree.
- 2. Dayaram Gidumal National College, Hyderabad (1922).—In Arts, permanently from June 1938, teaching up to the standard of the B. A. Degree for both Pass and Honours courses in English, History and Economics, and Philosophy and for the Pass courses in Sanskrit, Persian and Sindhi, subject to a maximum of 160 students in the First Year Arts & Science classes, 100 in the Intermediate Arts class and 100 in the Junior and Senior B. A. classes together. In Science, for Intermediate Science Examination, in Group A permanently but in Group B provisionally for 3 years from June 1938, subject to the admission of 72 students in both groups, with a maximum of 24 students in Biology.
- 3. Nadirshaw Eduljee Dinshaw Engineering College, Karachi (1922).—In Technology, permanently for the purposes of the Examinations leading up to the Degree of B. E. (Civil), subject to a maximum of 50 students in each of the three classes, F. E., S. E. and B. E., and also permanently from 1937 for the teaching of courses leading up to the Degrees of B. E. (Mechanical) and B. E. (Electrical) subject to a maximum of 10 students in each of these branches.
- 4. S. C. Shahani Law College, Karachi (1926).—In Law, for teaching the courses of study leading to the LL. B. Degree, provisionally for a further period of three years from June 1938.
- 5. The Chellasing and Sitaldas Upper Sind Arts College, Shikarpur (1933).—In Arts as a Second Grade Arts College, provisionally affiliated for 2 years from June, 1937 subject to a maximum of 125 students in the First Year Arts class and 60 students in the Intermediate Arts Class and for the B. A. (Honours) Examination in English, Persian, History and Economics, and B. A. (Pass) Examination in English.

^{*} Provisionally upto June, 1939.

Persian, Sindhi and History and Economics subject to a maximum of 60 students in Junior and Senior B. A. classes, taken together. In Science, for the teaching of Science courses for the first 2 years leading to the Intermediate Science Examination, with a maximum of 30 students in the First Year Science class and 30 students in the Intermediate Science class, of whom not more than 15 students shall be in the Biology Group.

CHAPTER XXXI.—RECOGNISED HOSPITALS AND APPROVED APPOINTMENTS.

(i) Hospitals and Laboratories recognized by the University.

I.—The Hospitals and Laboratories attached to the Grant Medical College, Bombay.—In Medicine for the purposes of all Medical Examinations.

II.—The Cama and Allbless Hospitals, Bombay.—In Medicine for the purposes of Branch III (Midwifery) of the M. D. Examination.

III.—Bombay Municipal Laboratory.—For Practical Instruction in Chemistry for the B. Hy. Degree (Diploma in Public Health) Examination.

IV.—The Sassoon Hospitals and the Byramjee Jeejeebhoy Medical School, Poona.—In Medicine for the purposes of the Examinations for the M. D. and M. S. Degrees.

V.—The Civil Hospital and the Byramjee Jeejeebhoy Medical School, Ahmedabad.—In Medicine permanently for the purposes of the Examinations for the M. D. and M. S. Degrees.

VI.—The Civil Hospital and Medical School, Hyderabad (Sind).—
In Medicine for the purposes of the Examinations for the M. D. and
M. S. Degrees.

VII.—The Civil Hospital, Karachi.—In Medicine for the purposes of the M. D. Examination (Medicine Branch only) and the M. S. Examination, subject to the proviso that the candidate should supplement his postgraduate study at the Hospital by attendance for a period of six months at the Pathological Laboratory of an affiliated Medical College in the case of the M. D. Examination and at the Dissection Room of such a College in the case of the M. S. Examination.

VIII.—The State General Hospital, Baroda.—In Medicine for the purposes of the M. D. (Medicine and Midwifery) and M. S. Examinations, subject to the following conditions.

(a) A candidate for the M. D. in Medicine should put in a course of Pathology for the M. D. Degree at the Pathological Laboratory of an affiliated Medical College for a period of six months.

(b) A candidate for the M. D. in Obstetrics should put in six months' work at the Bai Motlibai and Petit Hospitals, Bombay, or at any other similar Hospitals which are fully recognized for this Degree.

(c) A candidate for the M. S. Degree should put in a six months' course of Operative Surgery at a fully recognized Hospital.

IX.—The A. P. Mission Hospital, Miraj.—In Medicine for the purposes of the Examination for the M. S. Degree, on condition that the

authorities agree to make the necessary arrangements for instruction in Regional Anatomy and Operative Surgery at an early date, and report to the Syndicate as soon as the provision is made.

X.—The Gokuldas Tejpal Hospital, Bombay.—In Medicine for the purposes of M. D. and M. S. Examinations.

XI.—The Hospitals and Laboratories associated with the Seth Gordhandas Sunderdas Medical College, Bombay.—In Medicine for the purposes of all Medical Examinations.

XII.—The Nowrosjee Wadia Maternity Hospital, Parel, Bombay.—
In Medicine for the purposes of post-graduate study in Obstetrics only for Branch III (Midwifery) of the M. D. Examination subject to the condition that candidates supplement their work by post-graduate study in the subject of Gynaecology either at the King Edward Memorial Hospital or any other recognized Institution for a period of at least six months.

(ii) Approved Appointments under the M. D. and M. S. Ordinances.

The following appointments are recognized by the Syndicate as approved appointments under the provisions of Ordinance 267 (iv), (v) and (vi) and of Ordinance 277 (iv):—

(1) Grant Medical College Hospitals, Bombay.

			100	
Tutors in Medicine				
Casualty Officers				M. D. (Medicine)
House Physicians				M. D. (Medicine)
Medical Registrar				
Tutors in Pathology	•••	•••	•••	M D (Pathology)
Tutors in Bacteriology		•••		M. D. (Pathology)
Tutor in Midwifery	•••	•••		
Honorary Assistant Ol	ostetri	e Physic	cian	M. D. (Midwifery)
House Physicians (Obs				
Tutor in Pharmacolog		•••		M.D. (Dhammanlaum)
Demonstrator in Phan		logy		M.D. (Pharmacology)
Tutors in Surgery		•••	•••	
House Surgeon	•••		•••	M. S.
Surgical Registrar	•••	•••	•••) M. S.
Casualty Officers		•••	•••	

(2) Cama and Allbless Hospitals, Bombay.

House Surgeons	
Resident Medical Officer	M. D. (Midwifery)
Honorary Assistant Surgeon	

(3) Sassoon Hospitals, Poona.

Medical Registrar	 •••	 M. D.	(Medicine)
Surgical Registrar	 	M. S.	,

(4) Civil Hospital, Ahmedabad.

Honorary Physician		•••		M.	D.	(Medicine)
Honorary Gynæcologist &	Obst	etrician	•••	M.	D.	(Midwifery)
Honorary Surgeon	•••	•••		M.		. ,

(5) Civil Hospital, Hyderaba	d (Sind).
Medical Officer I/C Medical Ward Medical Officer I/C Women's Ward	M. D. (Medicine)
Medical Officer I/C Women's Ward	Do.
Medical Officer I/C Pathological and Clinic	cal
	M. D. (Pathology)
(6) Civil Hospital, Kare	
Honorary Physicians Honorary Surgeons House Surgeon	M. D. (Medicine)
Honorary Surgeons	M. S.
House Surgeon	M. D. (Medicine) M. S.
20.	M. S.
(7) State General Hospital,	
House Physician	M. D. (Medicine)
House Surgeon	Do.
Do Surgical Registrar	M. S.
Surgical Registrar	M D (Midwifery)
Lady Doctor	M. D. (Midwinery)
Lady Doctor	l, Miraj.
Surgical Resident Assistant to the visiti	ng M C
Surgeons	
(9) Gokuldas Tejpal Hospita	
House Physician	M. D. (Medicine)
House Physician House Surgeon	M. S.
(10) Seth Gordhandas Sunderdas I	Tedical College and
King Edward VII Memorial Hos	spital, Bombay.
Medical Registrar	
House Physicians	M. D. (Medicine)
Casualty Officers	m. D. (Methorne)
Medical Tutors	
Resident Pathologist	
Pathological Externe	M. D. (Pathology)
Demonstrators in Pathology and	
Bacteriology Obstetric Registrar	ar m (aria in)
Resident Accoucheurs	M. D. (Midwifery)
Gynæcological Registrar	Do. (Branch III).
Do. House Surgeons	Do. (Blanch III).
Demonstrators in the Pharmocology	
Department of the Seth Gordhandas	M. D. (Pharmacology).
Sunderdas Medical College.	
Surgical Registrar	
House Surgeons	M. S.
Casualty Officers Surgical Tutors	
Surgical Lucis	OF COTTOOLS

CHAPTER XXXII.—RECOGNITION OF SCHOOLS.

[Under Section 33 (2) (kk) of the Act.]

S. 187.

In the following Statutes unless there is anything repugnant in the subject or context, (a) the "Presidency" shall mean the whole of the Province of Bombay (excluding Aden) but including the

Province of Sind and such other territories as may from time to time be notified by the Government of Bombay in the Bombay Government Gazette under Section 4A of the Bombay University Act, 1928, and (b) the "Department" shall mean and include the Department of Public Instruction of the Government of Bombay and the Department of Public Instruction of the Government of Sind.

- *S. 187A.
- Subject to the provisions of the Statutes set out hereinafter, the Syndicate may from time to time frame Ordinances laying down conditions for schools applying under S. 188 for recognition or renewal thereof for the purpose of sending up candidates for the Matriculation Examination.
- S. 187B. Subject to the provisions of the Statutes set out hereinafter, the Syndicate shall lay down conditions for the admission of candidates to the Matriculation Examination.
- S. 188. Applications for recognition or renewal thereof from schools other than those referred to in S. 193A shall be addressed to the Registrar before such date as may be fixed by the Syndicate in this behalf and shall be accompanied by such information as may be prescribed by the Syndicate. Every application shall be accompanied by a fee of Rs. 10 which shall in no case be returned. This fee shall, however, be credited as the fee for the first year (to be paid by a recognized school under Statute 189) for which recognition is granted or renewed as a result of the application.
- O. 157A. An application for recognition or renewal thereof must be made by a school at least eighteen months before the date of the Examination for which the school desires to send up candidates.
- S. 189. Every recognized school shall pay a fee of Rs. 10 annually on or before such date as may be fixed by the Syndicate.
- 0. 157B. The annual fee prescribed under Statute 189 shall be paid in the month of July every year. Failure to pay the fee may involve the withdrawal of recognition.
- S. 190. A school applying under Statute 188 for recognition or renewal thereof shall satisfy the Syndicate—
 - (a) that the school maintains regular classes from the 4th Anglo-Vernacular standard upwards;
 - (b) that the school supplies a need in the locality in which it is situated;
 - (c) that the management is so constituted as to offer a reasonable prospect that the school will be well conducted;
 - (d) that the qualifications of the teaching staff and the conditions governing their tenure of office are such as to make due provision for the courses of instruction to be undertaken by the school and to ensure a reasonable continuity of its teaching staff;

^{*}The Ordinance framed by the Syndicate laying down conditions to be observed by High Schools recognized or seeking recognition by the University under S. 188 is printed as an Appendix at the end of this volume.

- (e) that the school is housed in suitable buildings and adequately equipped;
- (f) that the resources at the disposal of the management are such as to afford a reasonable expectation that the school will be efficiently maintained;
- (g) that the fee to be paid by the pupils will not involve such competition with any existing school in the same locality as would be injurious to the interests of education;
- (h) that the admissions and promotions of pupils have been made in accordance with instructions issued by the Syndicate from time to time in that behalf.
- S. 190A. On receipt of an application for recognition from a school which has been refused recognition by the Department, the Syndicate on being satisfied, after making a reference to the Department, that a prima facie case has been made out for a consideration of the application for recognition, may arrange with the Department for a joint inspection by an inspector appointed by the Syndicate and an inspector appointed by the Department. The Syndicate may take such action as they deem fit on such joint report.
- On receipt of an application for the recognition of a school which has not previously sought recognition from the Department or of a school situated in an Indian State or in Goa, the Syndicate may make such inquiry as may appear to them necessary, and on being satisfied that a prima facie case has been made out for entertaining the application, they shall appoint one or more persons to inspect the school and to report whether the application should be granted or refused. The Syndicate may take such action as they deem fit on the report.
- S. 190C. The Syndicate shall arrange for the periodical inspection of schools recognized under S. 190A and S. 190B to satisfy themselves that the schools are efficiently maintained and are observing the conditions of recognition, etc., laid down by the Syndicate from time to time for the proper conduct of such schools.
- S. 191. The Syndicate may at any time withdraw recognition from a school recognized under Statutes 190A and 190B for failure to comply with the conditions of recognition, provided that two-thirds of the members of the Syndicate present at the meeting vote for the withdrawal. Provided further that in the case of permanently recognized schools, the recognition shall not be withdrawn without a previous warning.
- S. 192. It shall be the duty of every recognized school—
 - (a) to supply the Syndicate, on or before the dates named, with such returns and information as they may require;
 - (b) to afford all facilities for inspection to members or representatives of the Syndicate;
 - (c) to maintain such records as the Syndicate may from time to time require;
 - (d) to carry out and observe such instructions as may from time to time be issued by the Syndicate.

- S. 193. The Syndicate shall maintain a register of schools recognized for the purpose of sending up candidates for the Matriculation Examination, and such schools only as are entered in the register shall be entitled to present candidates for the said Examination. The Syndicate shall have power from time to time to add to this list the names of such schools as shall appear to them to merit recognition. Any school recognized before the enactment of this Statute shall continue to enjoy the rights conferred upon it by such recognition, save in so far as such rights may be withdrawn or modified by the Syndicate.
- S. 193A. All schools in the Presidency maintaining regular classes from the Anglo-Vernacular 4th standard upwards, or the corresponding standards in the case of European and English Teaching schools,* and recognized by the Department up to and including the Matriculation Class shall be entered in the register referred to in Statute 193, on receipt of the fee prescribed by Statute 189, subject to the conditions and limitations under which they have been recognized by the Department. Provided always that the Syndicate may bring to the notice of the Department any irregularities in the conduct of any of these schools of which the Syndicate may be aware. Whenever any irregularity is thus brought to its notice, the Department shall hold an inquiry with a view to reconsidering, in the light of the information supplied by the Syndicate, its previous decision recognizing the school.
- S. 193B. The Department may bring to the notice of the Syndicate any irregularities in the conduct of any school in the Province of Bombay or Sind, as the case may be, recognized by the Syndicate but not by the Department, of which the Department may be aware. Whenever any irregularity is thus brought to their notice, the Syndicate shall hold an inquiry with a view to reconsidering, in the light of the information supplied by the Department, their previous decision recognizing the school.

CHAPTER XXXIII.—RECOGNITION OF EXAMINATIONS OF OTHER UNIVERSITIES.

[Under Section 24 (h) of the Act.]

- R. In all cases in which recognition has been given to the examinations of other Universities and Bodies as equivalent to the corresponding examinations of this University, such recognition is available only to those Universities and Bodies which reciprocate with this University, and applicable only to such students as have attended a regular course of study laid down for the examination at a College affiliated to the University or included among its constituent Colleges, or at an Institution recognised by the Body concerned.
- R. 2. Where such reciprocation does not exist, the Intermediate Arts, Intermediate Commerce and Intermediate Science Examinations will be accepted as equivalent to the First Year Arts, First Year Commerce and First Year Science certificate examinations respectively of this University.

^{*} The eighth standard in English teaching schools and the ninth standard in European schools correspond to the 7th standard of an A. V. School.

Chap. XXXIII] RECOGNIZED EXAMINATIONS OF OTHER UNIVERSITIES 91

Statement showing the examinations of other Universities and Bodies which have been recognized as equivalent to the corresponding Examinations of this University:

3.

R.

A CONTRACTOR OF THE PARTY OF TH		-	
Name of the University or Body.			Examinations recognized as equivalent to the corresponding Examinations of this University.
Agra			B.A., B.Sc., B.Sc., (Ag.)*[=B.Ag.] M.A., M.Sc., LL.B.
Aligarh		•••	Inter. Arts, Inter. Science, B.A., B.Sc., B.T., M.Sc. (for the purpose of D.Sc. Degree), Inter. Science, (for admission to the Medical course††).
Allahabad			Inter. Arts, Inter. Science, B.A., B.Sc., B.Sc. (Agri.), I.L.B., M.A., M.Sc., M.B., B.S. ‡
Andhra		•••	Inter. Arts, Inter. Commerce †, Inter. Science, B.A., B.Sc., M.B., B.S., B.Ed. (B.T.)
Annamalai			Inter. Arts, and Science ¶; B.A., B.Sc., M.Sc.
Benares			Inter. Arts, Inter Science, B. A., B.Sc., M.A. & M.Sc. for admission to the LL B. course, LL.B.
Calcutta			Inter. Arts, Inter. Science, B.A., B.Sc., LL.B., B. Com. (for only LL.B.§), M.B., B.S.‡, B.T. (for the purposes of admission to the M.Ed. Degree), M.Sc.
Dacca			B.A., B.Sc., B.L., M.A., M.Sc.
Delhi	•••		Inter. Arts, Inter. Science, B.A., B.Sc., Inter. Arts with Commerce Group(Inter. Com.)
Lucknow			B.A., B.Sc., M.A., M.Sc., LL.B., M.B., B.S.;
Madras	•••		Inter. Arts, and Science, B.A., B.L., B.Sc.,
			(for admission to the M.Sc. and LL.B. courses) M.Sc., M.B., B.S., ‡ B.E.
Mysore			Inter. Arts and Science, B.A, B.Sc., B.T. (for admission to the M.Ed. Examination).
Nagpur	•••	•••	Inter. Arts, Inter. Science, B.A., B.Sc., LL.B., B.T.
Osmania			(None of the examinations is recognized.)
Patna			Inter. Arts, Inter. Science, B. A., M.B., B.S.
Punjab			Inter. Arts, Inter. Science, B.A., B. Sc., B. Sc. (Agri), B.T., F. Y. Exam. in Commerce (=Inter. Com.), LL.B., M.B.B.S.,‡ M.A.
			(

^{*} If taken in the First or Second Class.

[†] If passed in Economic Geography, Banking and Accountancy. ‡ For admission to the higher courses in the Faculty of Medicine.

[§]Provided the Calcutta University agrees to recognize the B. Com. of the Bombay University for admission to LL.B. classes.

[¶]If passed in Arts subjects, = Inter. Arts and if passed in Science subjects, = Inter. Science.

subjects, = Inter. Science.

Arts Subjects—mean the following, viz., (1) Logic, (2) Indian History,
(3) Ancient History, (4) Modern History, (5) 3rd Language, (6) Economic History of England and Economic Geography, (7) Geography, (8) Mathematics.

Science Subjects—mean the following, viz., (1) Mathematics, (2) Physics,
(3) Chemistry, (4) Natural Science.

†† Provided the holder produces a certificate from the Registrar of the Punjab University declaring him eligible for admission to the Punjab Medical College.

College.

Name of the University or Body.	Examinations recognized as equivalent to the corresponding Examinations of this University.
Rangoon Hong-Kong	Inter. Arts, Inter. Science, B. A., B.Sc.
mong-mong	(a)
and Intermediate Edu-	(c) High School (=Matriculation), Inter. Arts, Inter. Science.
cation, U.P. Allahabad	Inter. Commerce if passed with 40 per cent. marks in each subject.
Board of High School and Intermediate Edu-	High School (=Matriculation).
cation, C. P., Nagpur.	(c) and (g)
Dept. of Education.	Secondary School Leaving Certificate (=Matri-
Mysore.	culation).
	High School (=Matriculation)*, Inter. Arts, (if
and Secondary Educa-	passed in Group A.), (=Inter. Arts).
tion, Dacca.	passed in Group A.), (=Inter. Arts).
	(f) & (c)
Education, Delhi.	High School (=Matriculation).
Board of High School	(c)
and Intermediate Edu-	High School (=Matriculation), Inter. Arts,
cotion Pain at a mark	Inter. Science.
cation, Rajputana Central India and	
Central India and Gwalior.	
Any Province in India.	European High School ($=$ Matriculation).
Oxford	School Certificate (=Matriculation).
Cambridge	School Certificate (=Matriculation).
London	Matriculation, Inter. Arts, Inter. Science.
Government of India	Diploma Examination of the Chiefs' College (=Matriculation).
*If passed with 40 per co	ent, marks in (1) English and or

*If passed with 40 per cent. marks in (1) English and 35 per cent. marks in each of the following subjects: (2) Modern Indian Language, (3) Mathematics, (4) History, (5) Geography, and (6) General Science or a Classical Language.

Mathematics and one other subject.

If passed in Course A with either Science or a Classical Language. (f) If passed in Course A with order Science of a Classical English.

(f) If passed in English, Mathematics, Additional Language, Elementary Science (including Domestic Science for girls) and History, Geography, and Economics as one of the two optional subjects.

(g) Provided the applicant is certified by the Registrar, Mysore University as being eligible for admission to the collegiate courses in the said University.

⁽a) If passed in English and any of the three subjects of History, Sanskrit, Pali, Persian, Latin, a Modern European Language recognized by this University, Mathematics, Geography, Economics, Fine Arts, Logic, Local Self-Government and Public Health.

 ⁽b) If passed in Mathematics or Biology, Physics, and Chemistry.
 (c) If passed with 40 per cent. marks in English and 35 per cent. marks in each of the other subjects.
(d) If passed in English, an Additional Language, History or Geography,

Chap. XXXIII] RECOGNIZED EXAMINATIONS OF OTHER UNIVERSITIES 93

Name of the University or Body.	Examinations recognized as equivalent to the corresponding Examinations of this University.
Madras and the States of Travancore, Cochin, Hyderabad (Deccan).	
Royal Indian Military	Diploma (=Matriculation).
College, Dehra Dun.	(c)
H. E. H. the Nizam's Government.	The High School Leaving Certificate (=Matriculation).
The Indian Mercantile Marine Training Ship 'Dufferin'.	Final Passing out Examination or the Examination conducted by the Governing Body for the Engineering Candidates (=Matriculation).
Educational Dept. of Burma.	Anglo-Vernacular High School Examination (=Matriculation).
of the Government of Nepal.	S. L. C. Examination (=Matriculation). (d) Matriculation (=Matriculation).
Board, Pretoria, South Africa.	manifoliation (—manifoliation).

- R. 4.
- The Matriculation or Entrance Examination conducted and controlled directly by every Statutory Indian University will be deemed equivalent to the Matriculation Examination of this University.
- R. 5.
- In no circumstances will the First Year's College Examination held by Colleges affiliated to any other Indian University be considered equivalent to the First Year's College Examination held by the Colleges affiliated to this University.

R. 5A.

In cases not covered by the Regulations governing the equivalence of examinations, the Syndicate shall have power, on the recommendation of the Standing Committee on Equivalence of Examinations, to grant recognition to Examinations of other Universities and Examining bodies on the merits of each individual case.

S. 200.

The Academic Council shall have power to declare any other examinations of any other Universities equivalent to the examinations of this University.

(d) If passed in English, an additional language, History or Geography, Mathematics and one other subject.

(h) Provided the holder produces a certificate from the Registrar of the Madras University declaring him eligible for admission to courses of study of the Madras University.

(i) This or any other examination recognized by the University of Rangoon, provided the candidate produces a certificate from the Registrar, Rangoon University, declaring him eligible for Matriculation in the said University.

⁽c) If passed with 40 per cent. marks in English and 35 per cent. marks in each of the other subjects.

XXXIV.-EXAMINATIONS

A. GENERAL.

Alterations of Dates of Examinations

Whenever any of the days, on which any examination has to be 0. 141. held according to the Ordinances for the time being in force, happens to be a public holiday, or when in the opinion of the Syndicate there is sufficient reason for altering the days for holding any examination as fixed by the Ordinances, it shall be competent to the Syndicate to fix such days other than the days fixed by the Ordinances for holding such examination as they may consider proper: Provided that notice shall be given by a notification in the Bombay Government Gazette of any such alteration of dates, as the Syndicate may direct, at least 15 days before the day fixed by the Ordinances for the commencement of such examination.

Appointment of Examiners

- 0. 142. Applications for examinerships shall be made to the Registrar in the prescribed form obtainable from the office of the Registrar, within the date which will be notified from time to time.
- The Registrar shall send a complete list of names received for 0. 143. examinerships in each subject to the Academic Council, who will recommend to the Syndicate suitable persons to be appointed as examiners.
- The Academic Council shall recommend to the Syndicate where-0. 144. ever possible a sufficient number of names to enable the Syndicate to exercise their discretion.

Acceptance of Endowments for Fellowships, Scholarships, Prizes, Medals, and other Awards

Except in the case of endowments for Fellowships, Scholarships, S. 200A. Prizes, Medals or other academic awards, the Syndicate shall have the power to accept donations and endowments of a value not exceeding Rs. 2,000, and if the interest of the University so require, to give up any such donations or endowments as it may have accepted: Provided that the benefits of the donations or endowments accepted under this statute shall not be restricted to a particular part of the territories under the jurisdiction of the University of Bombay or a particular community.

Award of Scholarships, Prizes and Medals

O. 144A. No candidate shall be eligible for any non-sectional Fellowship, Prize, Medal, or other award, who presents himself for the examination to which the award relates more than two years after the expiry of the minimum period prescribed by the regulations governing that examination. The computation of the period for the purpose of this regulation shall begin from the date of the passing of the preceding lower examination which qualifies the candidate to enter on the course for the higher examination.

Exemptions

Except as herein otherwise provided, a candidate who has passed 0. 145. a University examination in a subject or subjects in which identical

EX-STUDENTS

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papers (and practical tests) are prescribed for another examination, shall (at his option) be entitled to exemption at the other examination from such subject or subjects; Provided always that the standard attained at the original examination is not lower than that required at the other examination. Candidates so exempted shall not be eligible for classes or for University awards.

0. 146.

When a student who has earned exemption in one or more subjects at an examination, appears next for that examination, he must once and for all make his election whether he will avail himself of the exemption or appear for the whole examination. If he elects to appear for the whole examination, then thereafter he cannot claim the benefit of the old exemption. But on his appearing for the whole examination he may again earn exemption in one or more subjects and such fresh exemption earned will again be subject to the above provision. If he elects to avail himself of the exemption, then he must appear in all the remaining subjects at the same time. It is open to him to earn further exemption in one or more of the remaining subjects in which he so appears.

0. 147.

If a candidate is allowed to join the next higher class because he has obtained exemption from all subjects but one in which he has failed, he will be allowed to appear in that one subject not later than the same examination season in which he appears at any time for the next higher examination. But he will, under no circumstances, be considered to have passed the next higher examination or any part of it although he may have obtained the marks necessary to pass, unless he has passed in the aforesaid single subject (with the percentage, if any, required for the total) at the lower examination in the same or in a previous examination season. But if a candidate passes as aforesaid in the single subject in the lower examination then he may earn as regards the higher examination any exemption that may be permissible under the Regulations although he may not have passed in the whole examination. When a candidate owing to his failure to pass in the single subject as aforesaid in the lower examination is not considered to have passed the higher examination or any part of it, the terms kept by him for such higher examination will be available to him for any further appearance at the higher examination.

Ex-Students

0. 148.

- (1) An ex-student is one who has satisfied all the requirements of the prescribed course of studies at his College, including the necessary minimum attendance, and is certified by the Principal as eligible for admission to an examination, and after certification does not join a College.
- (2) A student falling under the definition of ex-student under rule (1) shall be entitled to receive a certificate from the Principal of the College last attended by him as mentioned in the said rule, whether or not he appears at the examination in the year in which he is so certified.
- (3) A student who has appeared at an examination and failed shall not require a fresh certificate to be entitled to appear again at the same examination unless in the meantime he has joined a College.

0. 149.

(4) The Principal of a College may by a certificate permit an ex-student who joined his college, and thereby forfeited his status as an ex-student, to appear for an examination, if he is satisfied with the candidate's conduct and progress, even though the candidate has not kept the terms as defined in O. 87.

Conduct of Examinations

All examinations, admission to which of candidates being dependent on their applying, by the appointed time, with the prescribed certificates and paying to the Registrar the prescribed fee through the head of the institution or otherwise as the Syndicate may direct, shall be held at such times, in such places and commencing on such dates as the Syndicate may appoint from time to time and as specified below:—

Examination.	How many times held in a year.	Where held.	Date of Commencement.	Date of Application.	Examination Fee.
	How p				Examir
Matriculation.	Once	Ah medabad, Karachi, Surat, Dharwar, Raj- kot, Baroda, Hyderabad (Sind), Kolha- pur, Sangli,* Bhavnagar, Belgaum, Nasik,*Dhulia,		Six weeks before the examination.	Rs. 15
Intermediate Arts.	Once	Baroda, Ahmedabad, Karachi, Sangli, Dharwar, Kolhapur, Bhav-		On or before the 20th February.	25
B. A. (Pass) (written).	Twice	Karachi. Ahmedabad, Dharwar (in		į	40
B. A. (Hons.)	Once	Bombay, Poona,	1st Monday in October. Monday following the 4th Monday in March.	On or before	50
B. A. (Pass) and (Hons.) Oral and Practical.			After conclusion of the written Examination.		
M. A. (By papers).	Once	Do	3rd Monday in April.	2 months before the examina- tion.	75

^{*} Provisionally for the Examination to be held in 1939.

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Examination.	How many times held in a year.	Where held.	Date of Commencement.	Date of Application.	Examination Fee.
M. A. (By thesis).		Bombay	Thesis may be submitted at any time.	Application to be sent along with the synopsis two months before the submission of thesis.	Rs. 75
Intermediate Commerce.	Once	Do	4th Monday in March.		25
B. Com	Twice	Do	4th Monday in March and 2nd Monday in October.	2 weeks before the	50
M. Com	Once	Do.'	3rd Monday in June.	6 months before the examina- tion.	
B. T. Part I.	Once	Do	3rd Monday in March.	15th Janu-	15
" " II.	Once		4th Monday in February.	Do	15
Intermed i a t e S c i e n c e, (Written).	Опсв	Science. Bombay, Poona, Surat, Baroda, Ahmeda b a d, K o l h a pur, D h a r w a r, Karachi.	4th Monday in March.	20th Febru- ary.	30
Intermediate Science, (Practical).	Once	Bombay and at other mofussil centres, provi- ded there are at least 80 candi- dates at the	sion of the written Examination.		
B.Sc. (Principal) B.Sc.	Once	Ahmed a b a d , Karachi.	Monday following the 4th Monday in March.	the 20th February.	
(Subsidiary)	Twice.	Do	Monday following the 4th Monday in March and 1st Monday in October.	20th Febru- ary and 1st September.	25*
B.Sc. (Practical)		Bombay	•••	•••	•••
M.Sc. (written)	Once	Do	3rd Monday in April (for Mathematics.) Last Monday in July for other subjects.	One month	

^{*}For both at a time Rs. 50.

S.E. (Mech. Once Poona Do Do Do 30 **Electrical.** March. before the examination. before the examination. Do 30 Do 30						
M.Sc. (thesis). M.Sc. (thesis). M.Sc. (French and German Translation Translation and Bangalore. M.Sc. (Agricul- Once ture.) B. Sc. (Agricul- Once ture.) M.Ag. Once Do. Do. Do. Do. Do. Do. Same as M.Sc. M.Sc. (Agricul- Once ture.) M.Ag. Once Do.	Examination.	How many times held in a year.	Where held.		AND ADDRESS OF THE PARTY OF THE	Examination Fee.
mitted at any time. mitted at any time the thesis, two months after the su bmission of synopsis. M.Sc. (French Twice and German Translation Translation Trest.) F.Sc. (Agricul- Once ture.) S. Sc. (Agricul- Once Do Do Do 30 B. Sc. (Agricul- Once ture.) M.Ag Once Do Do Do Do 50 M.Sc. (Agricul- Once ture.) M.Ag Once Bombay Third Monday in March. F.E Once Poona, Karachi. F.E Once Poona, Karachi. S. Sc. (Agricul- Once Do Do Do 30 M.Sc. (Agricul- Once Do Do 30 March. Do 30 M.Sc. 2 months before the examination. M.Sc. 2 months before the examination. M.Sc. (Givil) Twice Do Do 30 Monday in March and 2nd Monday in March and 2nd Monday in Once Do 50 M.Sc. (Givil) Twice Do 30 M.Sc. (Do Do 30 M.Sc. 2 months before the examination. M.Sc. 2 months before the examination. M.Sc. 30 M.Sc. 2 months before the examination. M.Sc. 30 M.Sc. 30 M.Sc. 2 months before the examination. M.Sc. 30						Rs.
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S. Sc. (Agricul- Once ture.) Do. Do.	and German Translation			January and last	before the examina-	25
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before the examina-	B.Sc. (Tech.)	Once	Bombay	3rd Monday in March.	before the examina-	100
	M.E	Once	Do	Do	before the	100

Examination.	How many times held in a year.	Where held.	Date of Commencement.	Date of Application.	Examination Fee.
		Law			Rs.
1st LL.B. (Old & New.)	Twice	Bombay, Poona, Kolhapur, Karachi, Ah- medabad.	in October.	before the examina- tion.	30
2nd LL.B. (Old	Twice	Do	Do	Do	50
& New.) LL.M	Once	Bombay Medicine	3rd Monday in June	2 months before the examina- tion.	150
1st M.B., B.S.	Twice	Bombay	1st Monday in December and 1st Monday in April		
2nd M.B., B.S.	Twice	Do	. Ist Saturday ir December and 1s Saturday in April	Do	15
3rd M.B., B.S.	Twice	Do	. 1st Monday in December and 1s	Do	45
В.Ну	Do.	Do		2 months before the	
D.P.H M.D M.S D.Hy D.O	Do. Do. Do.	Do Do Do Do Do	Do Do Do Do	Do Do	200 200

0. 149A.

Examination fees once paid shall not be refunded or held in reserve for a future examination except in the circumstances and to the extent mentioned below :-

Where the candidate dies prior to the examination, the entire (1)

fee shall be refunded;

The entire fee may be refunded or held in reserve at the discretion of the Syndicate, in the case of examinations for Masters' or Doctors' degrees, provided that the application for refund or reservation is made at least seven days before the date of the examination, and good and sufficient reason is shown for the same;

^{*} Rs. 25 for each group. † Rs. 100 for an M.D. who appears for a different Branch and for an M.S.

[†] Rs. 100 for an M.D.

**The first examinations for B.Hy., M.D., M.S., D.Hy. & D.O. degrees according to the amended Ordinance will be held in October 1939.

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EXAMINATIONS

[Part II

- (3) Where a candidate is suddenly taken ill and prevented from appearing at an examination, and sends in an application for refund supported by a medical certificate, so as to reach the University Registrar 24 hours before the commencement of the examination, one-half of the fee shall be refunded.
- 0. 150. When there is more than one centre for a written examination, question papers shall be given to candidates on the same day and at the same time in every centre.
- 0. 151. (i) Unless otherwise specially provided for, all examinations except practical and viva voce shall be conducted by means of printed or written papers.

(ii) Candidates must answer the question papers in English except when otherwise stated.

- O. 152. No question calling for a declaration of a religious belief on the part of a candidate shall be put at any University examination, and no answer or translation given by any candidate shall be objected to on the ground of its giving expression to any particular form of religious belief.
- O. 153. As soon as practicable after the conclusion of an examination, the Syndicate shall publish a list of the names of successful candidates in the following manner, the names, except when otherwise stated, being arranged in alphabetical order:—

Examination.

The Result: How Published.

Arts-

Matriculation In one class.
Intermediate Arts In two Classes and Pass.
Bachelor of Arts Do.

Master of Arts (By papers)
Do.
Intermediate Commerce

Intermediate Commerce Do. and names in class I arranged in order of merit.

Bachelor of Commerce Do. Do.

Master of Commerce In one class.

Bachelor of Teaching Pass and Pass with distinction

Bachelor of Teaching
(Parts I & II together)
Master of Education

Pass and Pass with distinction, if twothirds of the Examiners recommend.

Doctor of Philosophy (Arts.) In one class. Doctor of Letters

Science-

Intermediate Science

Bachelor of Science

Master of Science (By papers)

Bachelor of Science (Agri.)

Master of Agriculture

Master of Science (Agri.)

Master of Science (Agri.)

In two classes and Pass showing if there is distinction in Principal subject.

Pass or Pass with distinction.

Pass and Pass with Honours.

In one class.

In one class.

CERTIFICATES

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Examination.

The Result: How Published.

Science—(contd.)

First Engineering

In two classes and Pass, names in class I arranged in order of merit.

Second Engineering (Civil, Mechanical and Electrical.)

Bachelor of Engineering (Civil, Mechanical and Electrical)

Bachelor of Science (Tech.) Master of Engineering.

Master of Science (Technology) In one class. Doctor of Philosophy

(Science.) Doctor of Science First year Examination in

Science (Agri). Second year Examination in Science (Agri.)

Bachelor of Science (Agri.)

First LL.B. (Old & New.)

Second LL.B. (Old & New.) Master of Laws.

First M.B., B.S.

Second M.B., B.S. Third M.B., B.S. Bachelor of Hygiene. Diploma in Public Health Doctor of Medicine. Doctor of Hygiene. Master of Surgery.

Diploma in Ophthalmology.

Do. Do.

The names In two classes and Pass. of those who Pass in each class in order of merit.

Pass and Pass with distinction. Pass and Pass with distinction.

In one class. In one class. Do.

In one class.

Pass and Honours.

Law-

In two classes. The names in First class arranged in order of merit. Do. Do.

In two classes.

Medicine-

In one class, showing the distinction in any subject.

> Do. Do. Do. Do.

In one class.

Do.

Pass with distinction or passed.

Do. Do. Do. Do.

In one class.

0. 154. When the examination is by thesis a list of successful candidates arranged in alphabetical order will alone be published.

> A candidate whose total is found to fall short of the requisite total for a first or a second class Honours or Distinction by 1, 2, or 3 marks may be given the necessary marks by which his total falls short, if on a review of the candidates' marks a majority of not less than two-thirds of the Examiners present decide that the candidate deserves the first or the second class Honours or Distinction, as the case may be.

Failure to Pass an examination will not disqualify the candidate for presenting himself on a subsequent occasion on a new application being forwarded and a fresh fee paid.

0. 156. A certificate will be given to those who Pass an examination.

0. 154A.

0. 155.

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O. 156A.

A statement in a printed form, showing the marks obtained by a candidate in each head of passing, will be supplied to him on payment of a fee of Rs. 2 per examination. Marks obtained by candidates in individual papers will also be supplied on payment of a fee of Rs. 5 per examination, provided an application is made within six months after the date of the declaration of the results. Marks obtained by candidates in individual questions or in sections of a paper will not be supplied.

0. 156B.

Information as to whether a candidate's answers in any particular head or heads of the Matriculation Examination have been examined and marked, will be supplied to the candidate on his forwarding through the Head of his Institution, within three months of the declaration of the said examination results, an application accompanied by a fee of Rs. 25 for each head. The fee is only for verifying whether a candidate's answers in any particular head have been examined, and not for the re-examination of answers. The rule that marks obtained by candidates in individual questions or in sections of a paper cannot, in any circumstances, be supplied holds good also in the case of applications for the verification of marks.

If as a result of the verification made under this clause, it is discovered that there has been either an omission to examine, or mark any answer or answers, or a mistake in the totalling of the marks, the fee for verification shall be refunded to the applicant.

0. 156C.

A copy of a certificate testifying to a candidate's having passed an examination held by the University will be issued on payment of a fee of Rs. 5.

0. 156D.

The fee for any certificate not provided for in any of the Ordinances is Rs. 5.

0. 156E.

A true copy of the form of application for admission to the Matriculation Examination will be issued on payment of a fee of Rs. 5, provided it is applied for during the course of three years from the date of the examination to which it relates.

0. 156F.

The fee for admission of an application for correction of the recorded birth date is Rs. 5.*

0. 156G.

The fee for the issue of certificates enabling students to obtain concessions from steamship companies is Re. 1.

О. 156Н.

A fee of Rs. 10 shall be chargeable to students who are not studying or have not studied within the territorial jurisdiction of the Bombay University and who apply for information or submit applications for admission to foreign institutions for transmission to the High Commissioner for India or to the institutions concerned.

0. 156I.

The fee for the issue of a matriculation certificate to enable the person applying for the same to be enrolled as a voter in the electoral roll of the Bombay Legislative Assembly or any Provincial Legislature, on the strength of his qualification as a matriculate of this University, shall be Re. 1 only. The Registrar shall be authorized to issue special certificates for this purpose, which need not contain all the details specified in Ordinance 170.

[•] For conditions under which an application is entertained, vide Circular No. M. 149 of the 20th January, 1932.

B. Admission to, Syllabus for, and standard for passing, Examinations

(1) MATRICULATION.

S. 201. S. 204A. Deleted *

The examination for Matriculation shall be in such subjects as may be from time to time prescribed as aforesaid, and the Syndicate may make provision for holding separate Matriculation Examination for different classes of students having regard to the courses of study which the students propose to follow.

0. 157D.

All applications for permission to appear at the Matriculation Examination must be forwarded to the Registrar through the heads of recognized schools, six weeks before the commencement of the Examination. No application that is not so submitted or is not complete in every respect will be accepted by the Syndicate and the names of the applicants whose applications are rejected will be communicated, as soon as may be, to the heads of the schools concerned.

S. 202.

Except when exempted by a resolution † of the Syndicate, no candidate shall be admitted to the Matriculation Examination

* Statute 201 which has been deleted read as follows:—

S. 201. Candidates must forward their applications to the Registrar, six weeks

before the commencement of the Examination. No application that

before the commencement of the Examination. No application that is not complete in every respect will be accepted by the Syndicate and the names of the applicants whose applications are rejected will be communicated, as soon as may be, to their Head Masters.

§ Please refer to S. 108.

†The last date for the receipt of applications for exemption from the attendance prescribed under Statute 202, is the 31st July of the year preceding that in which an applicant for exemption desires to appear for the Matriculation Examination. Applications for exemption will be considered from full-time employees only, of—

(a) Schools maintained or recognized by a Local Authority, such as a Municipality, or a District Local Board in the Provinces of Bombay and Sind, or the Schools Committee of the Bombay Municipality;

(b) Schools situated in the Provinces of Bombay and Sind, which are not within the jurisdiction of a Local Authority, or the Bombay Schools Committee; and

c) Schools in the Indian States situated within the jurisdiction of the Bombay University;

on condition that (i) the exemption shall be available only to those teachers who have been in continuous service from the month of June of the year preceding that in which the Matriculation Examination is held, and that (ii) the application for exemption is supported by a certificate from—

(ii) the application for exemption is supported by a certificate from—
(i) the Administrative Officer of the School Board of the Local Authority, or the Secretary of the Schools Committee of the Bombay Municipality, as the case may be, in the case of applicants under (a);

(ii) the Educational Inspector of a Division, in the case of applicants under (b); and

(iii) the highest Educational Officer of the Indian State concerned, in case of applicants under (c).

The certificate in each of the above cases should be to the effect that the school is recognized or maintained by the Local Authority, the Bombay Schools Committee, the Government or State Educational Department, as the case may be, and that the applicant has been a full-time employee of the school from the month of June of the year preceding that in which the Matriculation Examination is held, and that his application is bona-fide. (Cir. No. M. 5480 of 1938).

unless he shall have attended the Matriculation Class of one or more recognized schools for not less than 110 days in the aggregate in a school year* and unless he produces satisfactory testimonials in the prescribed form.

- S. 203. A candidate who has satisfied all the requirements of the prescribed courses of studies at his school, including the necessary minimum attendance, but who has not appeared for the Examination subsequently through any other recognized school and who wishes to appear at the Matriculation Examination shall, on payment of the prescribed fee, be admitted to that examination if he has been on a previous occasion admitted to that examination (or recommended for such admission by the head of the recognized school, the Matriculation class of which he last attended), provided that he produces a certificate
- Six weeks before the commencement of the examination, each candidate for examination shall pay or cause to be paid to the Registrar at Bombay or to such person as he may appoint in the mofussil, a fee of Rs. 15 for which a receipt will be given. Candidates who apply to be examined in any special head as prescribed by the regulations shall pay an additional fee of Rs. 2 for every such head.
- O. 157E.

 A candidate who has attended the Matriculation Class of a recognized school or schools for not less than 110 days in the aggregate as required by S. 202 in one and the same school year, and either has or has not been recommended for admission to the Matriculation Examination, shall be exempted from further attendance and shall be admitted to the Matriculation Examination, on production of the satisfactory testimonials in the form prescribed for admission to the Examination. This Ordinance shall apply only to the attendance kept on and after the 1st June 1937 in schools other than those situated in the Province of Sind and the Baroda State, and to the attendance kept on and after the 1st April 1937 in schools situated in the Province of Sind and the Baroda State.
 - An ex-student is one who has satisfied all the requirements of the prescribed course of studies, including the necessary minimum attendance (unless exempted by the Syndicate) required under S. 202 and has been recommended by the head of a school for admission to the

^{*} Heads of recognized schools are hereby informed that for the purposes of S. 202, the term "school year" shall mean, save in the case of schools situated in the Province of Sind and the Baroda State, the period which commences on the first day of June and ends on the date in the following year fixed by the Syndicate for the receipt of applications from candidates for admission to the Matriculation Examination. In the case of schools situated in the Province of Sind and the Baroda State, the commencing date of the period shall be the first day of April.

[†]An ex-student as defined in O. 157F. who changes his Science Group need not keep a fresh attendance of 110 days. He will be permitted to appear with the changed Science Group, provided that he has completed the practical courses prescribed in the group concerned, to the satisfaction of the Head Master of the school from which be seeks admission to the Matriculation Examination and produces a certificate from the latter to that effect. Also, an ex-student who changes one or both the languages for the Matriculation Examination need not keep a fresh attendance (Cir. No. M. 5857 of 1937).

Matriculation Examination and has not subsequently joined any school after such recommendation. For the purpose of this Ordinance all candidates—regular students, ex-students and private candidates—who were sent up for the Matriculation Examination held in April 1937 or prior to it are considered as ex-students. An exstudent is exempted from the attendance prescribed in S. 202.

- O. 1576.

 An ex-student shall be entitled to receive a certificate with regard to his eligibility for admission to the Matriculation Examination from the head of the school who recommended him for admission, whether or not he appeared at the Examination in the year in which he was so recommended.
- O. 157H.

 If an ex-student joins a school during the school year immediately following the Matriculation Examination at which he failed, he will be entitled to receive a certificate with regard to his eligibility for admission to the Matriculation Examination, from the head of that school only, which he has joined or which he left last, before seeking admission to the Matriculation Examination, provided there is nothing on record against the student's conduct and progress.

Provided the head of a school shall have the right to refuse to certify an ex-student if he leaves the school on or after the 15th January preceding the Matriculation Examination.

- O. 1571. The head of a school may charge a fee of Re. 1/- from every ex-student wishing to have his application forwarded for permission to appear at the Matriculation Examination under O. 157G. or O. 157H.
- An ex-student of a school which is not now on the University Register of recognized schools or which is not now in existence shall be sent up as such for the Examination by the head of any recognized school, provided he has not joined a school during the school year of his application for admission to the Matriculation Examination. The head of a school whom such an ex-student approaches with a request for forwarding his application and the Examination fee to the University shall not charge any fee other than the fee prescribed in O. 157I., viz., Re. 1/-.
- 0. 158. Candidates will be examined in the following five heads:—

I.—General English, without texts ... One Paper.

II.—(a) (i) One of the Modern Indian Languages, namely, Marathi, Gujarati, Kannada, Sindhi, Urdu, and Hindi, with texts... One Paper.

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(ii) An additional paper in English, with texts One Paper.

and

			and				
	(b) (i)	One of the namely, San Magadhi, Av Persian, Lati with texts	skrit, Pa esta-Pahl	di, Ara avi, Ara	dha- abic,	One Pa	per.
			01.				
	(ii)	One of the Languages, German, Por	namely	Fren	ch,		
		Italian, with				One Pag	per.
III	-History	and Geograp	hy	•••		One Pa	per.
TV	-Mathem	natics, consist	ing of A	Mebra	and		
						Two Pap	ers.
V	(2) P (3) B (4) D	eneral Science hysics and Ch otany and Zoo omestic Scien	emistry, ology, or ce, or	or 	}	One Pa	per.
	(5) P.	hysiology and	Hygiene)		

Each paper shall be of three hours' duration and shall carry 100 marks.

A candidate shall not be permitted to appear in Head V unless he produces a certificate from the Head of a recognized High School showing that he has carried out satisfactorily the practical course prescribed therein.

The marks obtained by a candidate in the two languages offered by him under Head II, and the marks obtained by a candidate in Algebra and Geometry under Head IV will be added together for a pass in each of those heads.

The examination in General Science and the examination in the new syllabus in Domestic Science laid down by O. 183 will be held in the year 1939 for the first time. The examination in Spanish and Italian will be held in 1943 for the first time.

- O. 159. A candidate may present himself for examination in Arithmetic (wherein Algebraical processes shall not be allowed) as an additional subject. The paper in Arithmetic shall be of three hours' duration and shall carry 100 marks.
- 0. 160. Deleted.
- O. 161. Candidates shall be examined by means of written questions set to them, which they will be required to answer in writing.

MATRICULATION

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0. 162.*

A candidate may at his option answer the question papers except those in English, Latin, Greek, Hebrew and the Modern European Languages, † either in English or in one of the Modern Indian Languages i. e. Marathi, Gujarati, Kannada, Sindhi, Hindi and Urdu. In the paper in History and Geography a candidate shall have the option of writing his answer to either section, in English or in a Modern Indian Language. A candidate choosing to answer any paper or a section or sections in the paper in History and Geography in a Modern Indian Language, shall specify his choice in his application. Question papers in any of the Modern Indian Languages shall be answered in that language. The Script used for Marathi ‡ must be Balbodh.

0. 163.

The standard required for a pass in the heads of the Examination shall be not less than 40 per cent. of the marks in head I and not less than 35 per cent. of the marks in each of the other heads. To obtain distinction in any head, a candidate must secure not less than 70 per cent. of the maximum number of marks obtainable under that head.

0. 164.

A candidate who appears in all the five heads of passing at one and the same Examination, but fails to obtain the required minimum for passing in only one head, shall be entitled to have his deficiency condoned according to the following rule:-

A deficiency of one mark in a head shall be condoned for every one per cent. by which the total marks secured by the candidate in the five heads of passing exceeds forty per cent. of the maximum number of marks obtainable under those heads.

0. 165.

If a candidate fails to obtain the required minimum in a head by 1 or 2 marks and does not obtain the total required for the condonation of his deficiency under Ordinance 164, or is not entitled to the benefit of Ordinance 164 by virtue of clause (c) of Ordinance 166, the aforesaid deficiency will be condoned, if the Committee, to be nominated by the Vice-Chancellor from time to time, decides, on a review of the performance of the candidate in the whole Examination, that it should be condoned.

*Heads of recognized schools are hereby informed that on considering the question of the terminology to be used by candidates in answering the papers in Science and Mathematics in a Modern Indian Language the Syndicate have

resolved to issue the following direction:

That even though the Science subjects and Mathematics may be taught in a Modern Indian Language, students should be instructed to employ English Terminology when using technical words or expressions in their answers to the questions set, or in the alternative, to place in parenthesis the English equivalents where the students employ technical terms or expressions in a Modern Indian Language. (Circular No. M. 4397 of 30th December 1935.)

† Heads of recognized schools are notified that in writing answers in German, the Roman script can be used, but that students are expected to have

a knowledge of the German script and their knowledge of that script may be tested at the examination. (Cir. No. M. 6706 of 15th December 1936).

Heads of recognized schools are hereby informed that on the recommendation of the Board of Studies in Marathi the Syndicate have resolved that the old Suddhalekhana Paddhati as propounded in Dadoba Pandurang's Vyakarana abould be followed in the University Framinations (Cir. No. M. 1102 of 19th should be followed in the University Examinations (Cir. No. M. 1193 of 12th March 1936.)

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- 0. 166.
- (a) A candidate who has obtained fifty per cent. or more of the total marks in any head may, at his option, be excused from appearing in that head at a subsequent Examination and will be declared to have passed the whole Examination when he has passed in all the heads of the Examination.
- (b) Exemption from appearing in any head at a subsequent Examination secured under Clause (a) ceases to operate as soon as the candidate appears in that head at any subsequent Examination.
- (c) A candidate who claims exemption under Clause (a) shall not be allowed the benefit of the condonation provided for in Ordinance 164.
- 0. 166A.

Exemptions earned in English, History and Geography, Mathematics and Elementary Science at the (Supplementary) Matriculation Examination held in March, 1937, or in any year prior to it, will hold good for the purpose of O. 166.

Exemptions earned by candidates in any one of the languages, namely, Marathi, Gujarati, Kannada, Sindhi, Urdu, Portuguese, Hindi, Sanskrit, Pali, Avesta-Pahlavi, Arabic, Persian, Hebrew, Latin, Greek, French and German at the (Supplementary) Matriculation Examination held in March, 1937, or in any year prior to it, will not be available to them unless they have obtained at the Matriculation Examination held in 1937 or 1938, 50 per cent. or more of the possible marks in the remaining language offered by them under O. 158 II (a) or (b).

0. 167.

A candidate who qualifies for the Matriculation Certificate under Ordinance 166 (a) shall not be eligible for any scholarship or prize or medal attached to the Matriculation Examination, and shall not be entitled to distinction in any of the heads of the Examination.

0. 168.

The Syndicate shall grant the Matriculation Certificate to candidates who pass in the five heads specified in Ordinance 158 at one and the same Examination or in accordance with the provisions of Ordinance 166.

0. 169.

On the 5th day of June, or on the following day if the 5th June be a Sunday or a Bank Holiday, every year, the Syndicate shall publish a list of candidates who have qualified for the Matriculation Certificate, together with the grand totals of marks obtained by each. The marks of candidates availing themselves of any exemption under Ordinance 166 will not be published.

0. 170.

The Matriculation Certificate granted to the successful candidate shall specify the heads in which he has passed with or without distinction and the additional subject of Arithmetic if the candidate has passed in that subject also, with or without distinction. Each certificate shall bear the holder's signature in English. Such certificates will be issued through the Heads of Schools presenting the candidates for the Examination.

MATRICULATION SYLLABUS

109

40 marks.

10 marks.

SYLLABUSES

(For 1939 & subsequent years).

*0. 171.

ENGLISH.

One Paper—(Three Hours)—100 marks.

The Syndicate shall require the Heads of recognized schools to certify that every candidate sent up for the Matriculation Examination has read in class at least 200 pages of one prose work and at least 1000 verses from one or more of the works in verse from a list drawn up the Board of Studies in English and approved by the Academic Council and the Syndicate. No questions shall be set on any of the books in the list.

The paper in English shall contain questions on Composition including essay-writing, letter-writing, precis-writing, paraphrase of passages in prose or verse or translation into English of a passage from one of the recognized Modern Indian languages of the Bombay Presidency. There shall also be questions on syntax, the sequence of Tenses, Direct and Indirect forms of narration, the proper use of prepositions, synthesis and analysis of sentences, elementary etymology (prefixes and suffixes), punctuation and figures of speech. Candidates shall have to explain easy idiomatic combinations of words and phrases, used in general conversation, excluding slang and obscure provincialisms. Questions on composition shall carry 60 per cent. of the marks.

0. 172.

Marathi, Gujarati, Kannada, Urdu, Hindi and Sindhi.

One Paper—(Three Hours)—100 marks.

- 1. Translation:—
 Translation of passages from easy English into Marathi, Gujarati, Kannada, Urdu, Hindi, or Sindhi, carrying 20 marks, and composition carrying 20 marks
- 2. Prescribed texts for detailed study:-
 - (a) Prose —100 pages (b) Poetry—750 lines

Poetry—750 lines } 50 marks.

3. Grammar, arising out of the texts ...

0. 173.

Sanskrit, Pali and Ardha-Magadhi.

One Paper—(Three Hours)—100 marks.

 Unseen translation from and into Sanskrit, Pali, or Ardha-Magadhi 35 marks.

(20 marks for translation from Sanskrit, Pali or Ardha-Magadhi into English or any of the approved Modern Indian Languages,

As a result of the consideration of some inquiries received from heads of recognized schools in connection with the list of books prescribed under O. 171, the Syndicate on the recommendation of the Board of Studies in English have resolved to direct that the heads of recognized schools should use their discretion in making selection from the list of books drawn up under O. 171 and if the book or books so selected are not completed in the class, the boys may be recommended to complete them at home. (Cir. No. M. 1111 of 1937).

plus 15 marks for translation from English into Sanskrit, Pali, or Ardha-Magadhi).

An easy narrative passage shall be set for translation.

2. Translation of passages from the prescribed texts, with or without explanation of specified words and expressions occurring therein 50 marks.

The prescribed texts (Prose and Poetry) shall comprise 400 lines of easy poetry selected from classical writers, and 25 pages (of demy size) of simple narrative prose.

- 3. The study of Pali and Ardha-Magadhi should begin at the High School on the basis of Sanskrit. The basis should consist of general knowledge of Sanskrit Grammar, as embodied in the First Book and the first twelve lessons of the Second Book of Dr. Bhandarkar. Thus, the fourth and fifth standards of the High School should be taken up by Sanskrit studies; based on this knowledge of Declension and Conjugation, the Pali and Ardha-Magadhi studies are to start from the sixth standard onwards, and Pali and Ardha-Magadhi Grammar and language should be given due attention during the last two years of study as well as at the Matriculation Examination.
- 4. Grammar, arising out of the texts:—

(compounds, recognition of forms, etc.) ... 15 marks.

0. 174.

Avesta and Pahlavi.

One Paper—(Three Hours)—100 marks.

1. Prescribed Texts:—Translation of passages from the prescribed texts, which should comprise about 28 pages (of demy size) of prose and poetry in Avesta and about 14 pages (of Royal 8vo size) in Pahlavi ...

50 marks.

2. Grammar:—Questions will be set on Avesta and Pahlavi Grammar, accidence and syntax of the type found in the Manuals of Ervad Sheriarji Dadabhai Bharucha's Lessons in Avesta, Parts I, II, and III and lessons in Pahlavi, Parts I, II, and III ...

15 marks.

3. Translation:—Translation of unseen passages from and into Avesta, carrying 10 and 5 marks respectively, and from and into Pahlavi, each carrying 10 marks

35 marks.

0. 175.

Arabic and Persian.

One Paper—(Three Hours)—100 marks.

- 1. Prescribed texts:—Translation and Explanation of passages from the prescribed texts which should comprise 50 pages of prose and 500 lines of poetry ...
- 40 marks.
- 2. Grammar:—Questions on Grammar arising out of the prescribed texts 10 marks.

MATRICULATION SYLLABUS

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- 3. Translation and composition :-
 - (a) Easy Composition: Candidates may be asked to write letters, narrate short stories or dialogues, describe familiar scenes, etc., so as to test their ability to write simple and correct Persian.

20 marks.

(b) Translation of unseen passages from and into Arabic or Persian 3

30 marks.

0. 176.

Latin, Greek and Hebrew.

One Paper—(Three Hours)—100 marks.

The paper shall be divided into two parts carrying equal marks (A) translation of passages from the prescribed texts, carrying 40 marks, and questions on Grammar arising therefrom, carrying 10 marks, and (B) translation of unseen passages from these languages into English, carrying 25 marks and vice versa, 25 marks. The passages prescribed under (A) should not exceed 50 pages of approximately 25–30 lines each.

0. 177.

French, German, Portuguese, Spanish and Italian.

One Paper—(Three Hours)—100 marks.

The paper should be divided into two parts, carrying equal marks, as below:—

- (a) Translation of passages from prescribed texts which should comprise not more than 100 pages of prose and 50 pages of poetry, carrying 40 marks, and questions on Grammar arising therefrom, carrying 10 marks;
- (b) Translation of unseen passages from French, German, Portuguese, Spanish or Italian into English, carrying 25 marks and vice versa, 25 marks.

0. 178.

HISTORY AND GEOGRAPHY.

One Paper—(Three Hours)—100 marks.

History (to carry 60 marks.)

N. B.—There will be more questions in the paper than are required to secure full marks, and on every head prescribed there shall be at least one question.

History of England.

The Stuart and the Hanoverian Periods—(only upto 1900 A. D. With special reference to the relation of England with the chief European powers. The study of those periods shall also include an elementary knowledge of the growth of the Empire and of the British Constitution.

Minute details of statutes, wars, treaties, plots, etc., should be omitted, but attention should be given to the causes and effects of great events leading to the political, industrial and social development of the country and also to the part played by great men and women.

History of India.

- 1. The Indian Constitution, under the Government of India Act, 1935: Elementary knowledge, in outline, of the following:—
 - (a) The Secretary of State and his advisers.
 - (b) The Governor-General and His Majesty's representative.
 (c) The Federal Executive and the Federal Legislature.
 - (d) The Provincial Executive. The Provincial Legislature.
 - (e) Local Self-Government.
- 2. One of the following Periods :-
 - (a) Ancient India From the earliest times (including the Indus Civilization) up to 1200 A. D. (including the early Islamic invasions.)
 - (b) Mahomedan Period Beginning with the Slave Dynasty to the death of Aurangzeb (including a study of the Deccan Sultanates and Vijayanagar Kingdom).
 - (c) Maratha Period From the rise of Shivaji to 1818 A. D.
 - (d) Growth and Expansion of the British Power in India up to 1858 A. D. (including a study in outline of the other European Powers in India).

Minute details of wars, treaties, statutes, etc., should be omitted. Attention should be given to the causes and effects of great and important events and the part played by great men and women.

Geography (to carry 40 marks.)

(Only an elementary knowledge is expected of candidates.)

General Geography.

The Earth as a heavenly body (omitting detailed astronomicl; study); its shape and size; rotation and revolution; Longitudes; Local Time and Indian Standard Time; day and night; latitude the seasons; zones of the Earth.

General relief of the surface of the Earth; land and water forms Denudation and Deposition.

Climate: factors determining temperature and its variations; isotherms; atmospheric pressure and winds; distribution of rainfall; Ocean currents and their influence on climate.

Major natural regions of the world, including vegetable and animal life.

Interaction of man and his environment; the effect of natural environment on man, his life and activities, and the change effected by man in his natural surroundings to suit his needs.

MATRICULATION SYLLABUS

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Principal vegetable and animal products. Minerals. Chief occupations and industries of the people of the world. Important towns and cities of the regions.

Trade routes by land, sea and air.

The Indian Empire, the study to include:

Natural divisions; the character of the coast and the position of plains, plateaus, high lands, mountains, river systems and lakes, as affecting the density of population, the occupations and settlements of the people, the growth of towns and ports and the lines of communication.

Climate and its influence on natural products and the life and habits of the people.

Natural resources; principal vegetable and animal products; minerals; principal industries.

Chief exports and imports: countries of origin and destination. Trade routes by land, sea and air.

Political divisions and chief cities.

Note.—Candidates should be able to draw an outline map of the Indian Empire and to insert therein the details studied. Wherever necessary, they should draw simple sketch maps as an integral part of their answers.

0. 179.

MATHEMATICS.

Algebra.

One Paper—(Three Hours)—100 marks.

Simple equations, easy factors, simple fractions, simultaneous equations of the first degree in two unknowns (with numerical coefficients), easy numerical quadratic equations (by factorisation), easy problems leading to the above types of equations, highest common factor and least common multiple (both as far as obtainable by easy factorisation), square root, use of squared paper for drawing graphs from tabular data, graphs of y=ax+b and $y=kx^2=(a, b, k)$, to be given numerical values), graphical solution of simultaneous equations of the first degree. Ratio, proportion, variation.

Note.—Questions of a complicated nature shall not be set. Teachers are recommended to explain the ideas of (i) a variable, (ii) a function, and (iii) the slope of a straight line, while teaching graphs.

Geometry.

One Paper—(Three Hours)—100 marks.

The questions in Practical Geometry shall be set on the constructions contained in Schedule (A) together with easy extensions of them as riders, if desired. A candidate should provide himself with a ruler graduated in inches and tenths of an inch and in centimetres and millimetres, set squares, a protractor, and a pair of compasses.

The questions on Theoretical Geometry shall consist of theorems, contained in Schedule (B) together with easy deductions from them,

and arithmetical illustrations. THE ORDER IN WHICH THE THEOREMS ARE STATED IN SCHEDULE (B) IS NOT IMPOSED AS THE SEQUENCE OF THE TREATMENT. Any proof of a proposition shall be accepted which forms a part of any systematic treatment of the subject.

Proof of theorems on congruent triangles in Geometry based on properties of similar triangles will not be accepted.

Note.—The use of intelligible abbreviations is recommended.

SCHEDULE-A.

Note.—All figures should be drawn accurately. Unless specifically required, students will not be expected to prove a construction but they must give a short explanation of the same, wherever necessary.

Bisection of angles, of straight lines and of arcs of circles.

Construction of perpendiculars to straight lines.

Construction of an angle equal to a given angle.

Construction of parallels to a given straight line. Simple cases of construction of triangles from sufficient data.

Division of straight lines into a number of equal parts.

Construction of tangents to a circle.

Construction of regular figures of 3, 4, 6, 8 sides in or about a given circle.

Description of a circle in or about (i) a triangle and (ii) a

Description of a segment of a circle on a given straight line containing a given angle.

SCHEDULE—B.

Angles at a Point.

If a straight line stands on another straight line, the sum of the two adjacent angles so formed is equal to two right angles; and the converse.

If two straight lines intersect, the vertically opposite angles are equal.

Parallel Straight Lines.

Assuming that when a straight line cuts a pair of parallel straight lines, the corresponding angles are equal, and its converse, prove that when a straight line cuts two other straight lines, if

- (i) a pair of alternate angles are equal, or
- (ii) a pair of interior angles on the same side of the cutting line are together equal to two right angles, the two straight lines are parallel; and their converses.

Straight lines which are parallel to the same straight line are parallel to one another.

Triangles and Rectilinear Figures.

The sum of the angles of a triangle is equal to two right angles.

If the sides of a convex polygon are produced in order, the sum of the angles so formed is equal to four right angles. *If two triangles have two sides of the one equal to two sides of the other, each to each, and also the angles contained by these sides equal, the triangles are congruent.

*If two triangles have two angles of the one equal to two angles of the other, each to each, and also one side of the one equal to the corresponding side of the other, the triangles are congruent.

If two sides of a triangle are equal, the angles opposite to these sides are equal; and the converse.

*If two triangles have the three sides of the one equal to the three sides of the other, each to each, the triangles are congruent.

*If two right-angled triangles have their hypotenuses equal, and one side of the one equal to one side of the other, the triangles are congruent.

If two sides of a triangle are unequal, the greater side has the greater angle opposite to it; and the converse.

Any two sides of a triangle are together greater than the third.

Of all the straight lines that can be drawn to a given straight line from a given point outside it, the perpendicular is the shortest.

The opposite sides of a parallelogram are equal; the opposite angles of a parallelogram are equal; the diagonals of a parallelogram bisect each other; and their converses.

If there are three or more parallel straight lines, and the intercepts made by them on any straight line that cuts them are equal, then the corresponding intercepts made by them on any other straight line that cuts them are also equal.

The locus of a point which is equidistant from two fixed points is the perpendicular bisector of the straight line joining the two fixed points.

The locus of a point which is equidistant from two intersecting straight lines consists of the pair of straight lines which bisect the angles between the two given lines.

Areas

Parallelograms on the same or equal bases and of equal altitude are equal in area.

Triangles on the same or equal bases and of equal altitude are equal in area.

Equal triangles on the same or equal bases are of equal altitude.

The square on a side of a triangle is greater than, equal to, or less than the sum of the squares on the other two sides, according as the angle contained by those sides is obtuse, right or acute. The difference in the cases of inequality is twice the rectangle contained by one of the two sides and the projection on it of the other.

If the sum of the squares on any two sides of a triangle is equal to the square on the third side, the triangle is right-angled.

^{*} Note.—Teachers would do well in the initial stages to accept the theorems marked with an asterisk as axiomatic and only at higher stages revert to them for their proofs.

In any triangle the sum of the squares on the two sides is equal to twice the square on half the base together with twice the square on the median which bisects the base.

Similar Triangles. Idea of similar Figures.

If a straight line is drawn parallel to one side of a triangle, the other two sides are divided proportionally*; and the converse.

If two triangles are equiangular, their corresponding sides are proportional*; and the converse.

If two triangles have one angle of the one equal to one angle of the other and the sides about these equal angles proportional,* the triangles are similar.

The ratio* of the areas of similar triangles is equal to the ratio of the squares on corresponding sides.

Definition of Sine, Cosine and Tangent of an acute angle.

Proof of $\sin^2 A + \cos^2 A = 1$.

Solution of right-angled triangles by the use of the formulae

$$\left. \begin{array}{l}
 a = c \sin A \\
 b = c \cos A \\
 a = b \tan A
 \end{array} \right\} \quad \text{where } \angle C = 90^{\circ}$$

Circle.

A straight line drawn from the centre of a circle to bisect a chord which is not a diameter is at right angles to the chord.

The perpendicular to a chord from the centre bisects the chord.

The perpendicular bisector of a chord of a circle passes through the centre of the circle.

The tangent at any point of a circle and the radius through the point are perpendicular to one another.

There is one circle, and one only, which passes through three given points not in a straight line.

†In equal circles (or in the same circle) (i) if two arcs subtend equal angles at the centres, they are equal; (ii) conversely, if two arcs are equal, they subtend equal angles at the centres.

In equal circles (or in the same circle) (i) if two chords are equal, they cut off equal arcs; (ii) conversely, if two arcs are equal, the chords of the arcs are equal.

Equal chords of a circle are equidistant from the centre; and the converse.

If two tangents are drawn to a circle from an external point.

(i) the tangents are equal;

(ii) they subtend equal angles at the centre of the circle;
 (iii) they make equal angles with the straight line joining the given point to the centre.

^{*} Proofs for only commensurable ratios are expected.

[†]Note.—Teachers would do well in the initial stages to accept the theorem as axiomatic and only at a higher stage revert to it for its proof.

If two circles touch, the point of contact lies on the straight line through the centres.

The angle which an arc of a circle subtends at the centre is double that which it subtends at any point on the remaining part of the circumference.

Angles in the same segment of a circle are equal; and if the line joining two points subtends equal angles at two other points on the same side of it, the four points lie on a circle.

The angle in a semi-circle is a right angle; the angle in a segment greater than a semi-circle is less than a right angle; and the angle in a segment less than semi-circle is greater than a right angle.

The opposite angles of a quadrilateral inscribed in a circle are supplementary; and the converse.

If a straight line touch a circle, and from the point of contact a chord be drawn, the angles which this chord makes with the tangent are equal to the angles in the alternate segments.

It two chords of a circle intersect either inside or outside the circle, the rectangle contained by the parts of the one is equal to the rectangle contained by the parts of the other; and the converse.

The medians of a triangle meet in a point (centroid).

The internal bisectors of the angles of a triangle meet in a point (incentre).

The perpendicular bisectors of the sides of a triangle meet in a point (circumcentre).

The altitudes of a triangle meet in a point (orthocentre).

0. 180.

GENERAL SCIENCE.

One Paper—(Three Hours)—100 marks.

Physiology.

- 1. The Skeletal System—the principal bones and muscles.
- 2. The Circulatory System—blood; heart; arteries, veins, and capillaries.
 - 3. The lymph, the lymphatic System and the Spleen.
- 4. The Respiratory System—trechea; bronchi; lungs; breathing; composition of air; pure and foul air; the value of exercise; temperature of body.
- 5. The Digestive System—teeth; pharynx; stomach; small intestine; large intestine; liver, how food is digested; types of food; absorption and nutrition; metabolism.
 - 6. The Excretory System—Kidneys; skin.
- 7. The Nervous System and the Senses—brain and spinal cord; the principal nerves; the eye; the ear; and vocal apparatus.
 - 8. The main ductless glands and their functions.

GENERAL SCIENCE—contd.

Botany.

- 1. Plants:—Functions of roots, stems, and leaves. Structure of the flower—fertilization. Nature's methods to secure fertilization.
- 2. Propagation of plant life by methods other than that of seed germination; runners; cuttings; grafting.
 - 3. Nourishment of plants; how absorbed; how utilized; manures.
 - 4. Air and sun-light, and their effect on the growth of plants.

Zoology.

- 1. Description of Amoeba.
- 2. Breathing apparatus of the fish.
- 3. Development of the frog from egg to tadpole.
- 4. Life history and metamorphosis of the silkworm.

Physics.

General Properties of Matter.

- 1. Upward pressure of water; floating bodies; use of hydrometers, (variable immersion only); submarines; aeroplanes, balloons, and dirigibles.
 - 2. Density and specific gravity.
- 3. Liquids in communicating vessels; fountains; water supply to cities; (omit Brahma's Press).
- 4. Pressure of air; air pressure at high altitudes; density of air at great heights; mercury barometer; aneroid barometer.
- 5. Relation between volume and pressure of a gas; distinction between pressures exerted by solids, liquids and gases.
- 6. Syringe; suction pump; cycle pump; (omit force pump with an air barrel.)
 - 7. Air pump (omit the discussion of types of air pumps).
- 8. Pneumatic tyres; vacuum fountain; Primus Stove; Siphon (ordinary).

Heat.

- 9. Thermometers—Fahrenheit and Centigrade; Clinical thermometer; (Omit Six's thermometer, discussion on the filling of a thermometer and errors in fixed points).
- 10. Expansion caused by heat; its effects; bursting of pneumatic tyres by heat; unequal expansion of different solids and liquids; expansion of gases. (Omit coefficient of expansion.) Exceptional behaviour of water between 0° and 4°C. Effects of sudden heating or cooling on glass vessels.
- 11. Three states of matter; cooling mixtures (ice and salt) increase in volume when water solidifies.
- 12. Conduction and convection; humidity and evaporation ventilation; use of chimneys for lamps and factories; vacuum flasks.

GENERAL SCIENCE—contd.

- 13. Radiation and absorption; effect on polished and rough surfaces; effect on black and white surfaces.
- 14. Capacities of substances for heat; a calorie (omit the definition of specific heat); measurement of heat; latent heat; evaporation and consequent lowering of temperature; factors that regulate evaporation.
 - 15. Effect of pressure on boiling point.
 - 16. Land and sea breezes.

Mechanics.

- 17. Energy; friction; brakes.
- 18. Lever; law of moments; balance; pulley, fixed and moveable; inclined plane.
 - 19. Springs; buffers; spring balances.
- 20. Centre of gravity; heavy bottoms of hydrometers; ballast in ships; rocking toys.
- 21. Pendulum; isochronism; relation between length and period of oscillation of a pendulum.
- 22. Steam engine; oil engine; the crank and the eccentric; the fly wheel; gearing. (Omit constructional details.)
- 23. Heat produced by friction or mechanical work; heat a kind of energy; transformation of energy; potential and kinetic types; conservation of energy. (Omit quantitative determination of mechanical equivalent of heat.)

Sound.

24. How sound is produced and carried; vacuum can carry light but not sound; mechanism of the larynx and the ear; distinction between musical sound and noise; reflection of sound; echoes; whispering galleries; gramophone.

Light.

- 25. Sources of light; reflection of light from a plane mirror; concave mirror and its principal focus.
- 26. Refraction of light (omit sine law and refractive index); use of a lens as a magnifier.
 - 27. Decomposition of white light; spectrum.
- 28. Photographic camera; the human eye; the simple type of microscope; optical lantern; telescope; elementary ideas of the principles involved in cinema and talkies.

Magnetism and Electricity.

- 29. Lodestone; magnetic needle; Earth a magnet; like and unlike poles; attraction and repulsion; mariner's compass; magnetic induction.
- 30. Electromagnets; permanent and temporary magnets; lines of forces.

GENERAL SCIENCE—contd.

- 31. Electricity produced by friction; two kinds of electricity; attraction and repulsion; conductors and non-conductors; electroscope. (It is expected that the discussion on frictional electricity is reduced to the necessary minimum.)
- 32. Current electricity; difference in electric potentials; simple cell; Le Clanche's cell: dry cell; accumulator.
 - 33. Electric circuit; a simple galvanometer.
- 34. Effects of electric current; incandescent lamp; arc lamp; heating apparatus.
- 35. Magnetic properties of a coil carrying a current; induced current simple dynamo; electric motor; electric bell; short circuit; fuses; electric shock.
- 36. Elementary idea of the principal involved in the working of Telephone, Telegraph and Wireless.

Chemistry.

- 1. Filtration; distillation; crystallization.
- 2. Elements and compounds.
- 3. Composition of air; combustion; oxidation; properties of oxygen.
 - 4. Oxides, acids, bases and salts.
- 5. Composition of water (qualitative), hard water and soft water; preparation of pure water.
- 6. Carbon and its uses; carbonic acid gas and its properties; presence in its air; relation to plant life and animal life; carbon monoxide.
 - 7. The uses of bleaching powder, Chlorine.
- 8. Sulphur; sulphurdioxide; sulphuric acid. (Omit manufacture of sulphuric acid.)
 - 9. Phosphorus; lucifer matches; safety matches.
- 10. Properties and uses of sodium hydroxide, sodium bicarbonate, sodium carbonate, sodium chloride and corresponding compounds of potassium.
 - 11. Soap and its preparation.
- 12. Preparation of quick lime from calcium carbonate and its uses ; slaked lime and lime water.
 - 13. Uses of mortar and cement.
 - 14. Glass and its preparation.
- 15. Properties and uses of iron; iron oxide; rust; tinned iron; galvanized iron. Uses of iron sulphate.
 - 16. Properties and uses of copper; copper sulphate.
- 17. Composition of (alloys) brass, bronze, german silver; gold and silver coins.

GENERAL SCIENCE—concld.

Hygiene.

- 1. Food values.
- 2. Clothing—textile fibres, cotton, the leading plant fibre; flax, a plant stalk fibre; other fibres; wool; silk; rayon; other animal resources for clothing, such as hides.
- 3. Drinking water—boiling, filtration and chlorination; supply of pure water to cities from wells, rivers, tanks.
 - 4. Sewage disposal.
- 5. Simple cases of enzyme action; curds; starch; sugar; alcohol; vinegar.
- 6. Deleterious effects of alcohol and narcotics, such as opium, cocaine, bhang, ganja.
- 7. Pests—the house fly, mosquito, flea, cockroach, rat; conditions favouring their multiplication; diseases they spread; and measures for their destruction. (Structure and detailed life history is not expected).
- 8. Epidemics—how caused and controlled; disinfectants; vaccination; inoculation.

0. 181.

PHYSICS AND CHEMISTRY.

One Paper—(Three Hours)—100 marks.

1. The Syllabus is such as can be taught in three academic years with three periods of 45 minutes per week devoted to it.

For guidance and convenience in teaching, the whole syllabus is tentatively divided into certain number of lessons.

- 2. Teachers are permitted to group together practical exercises so as to secure co-ordination between the theoretical and practical exercises in different sections.
- 3. Teachers are at liberty to teach any portion at any time during the period of three years, but in order to secure co-ordination between different schools, it is recommended that the following plan be adopted:—

STANDARD V.

Sound, Light, Magnetism and Electricity, with related practical exercises.

STANDARD VI.

Mechanics, General Properties of Matter, and Heat, with related practical exercises.

STANDARD VII.

Chemistry with practical exercises, and revision of Physics.

4. Heads of schools are expected to see that students keep a record of the practical exercises performed by them.

Physics — (Theoretical)

- 1. Archimedes, Upward pressure of water, floating bodies, use of hydrometers (variable immersion), density and relative density.
- 2. Liquids in communicating vessels; fountains; water-supply. to cities. Capillary tubes and Bramah's Press.
- 3. Galileo, Torricelli and Pascal. Pressure of air. Pressure of air on high mountains. Density of air at great heights. Ascent of Mt. Everest. Mercury barometer. Aneroid barometer. Effect of pressure on boiling liquids.
- 4. Ink-filler; a syringe; suction pump; kerosene oil pump; cycle pump. The force pump with an air barrel.
- 5. Von Guerrick. Air pump. (Omit discussion regarding different types of air pumps.) Magdeburg hemispheres; effect of the reduction of pressure on a barometer placed in vacuum. Baroscope Vacuum does not carry sound.
- 6. Boyle. Relation between P and V; Distinction between pressure exerted by solids, liquids and gases. Elementary idea of Kinetic Hypothesis.
- 7. Air cushions, pneumatic tyres, Vaccum post, football, siphon (ordinary and intermittent). Vacuum fountain, Hero's fountain, intermittent fountain, Primus Stove. (Detailed explanation is not expected.)
- 8. Elasticity, spring balance, buffers, bending of beams, spring board.
- 9. Count Zeppelin and Wright Brothers. Balloons, Aeroplanes Cartesian Divers, Submarines, Parachutes, Diver's Dress. (The treatment should be elementary and popular.)
- 10. Newton. Motion; average speed, velocity, composition of velocities; circular motion.
- 11. Acceleration, momentum, force; Inertia: Parallelogram of forces. Action and reaction are equal and opposite. Work, Power, Energy; Law of conservation of energy; Friction, Brakes.
- 12. Lever, law of moments; Balance; Pulley, fixed and movable; Inclined plane; applications of the Screw, Screw-Jack, etc. Change of linear motion into circular and *vice versa* in machinery. Gearing.
- 13. Centre of gravity. Tower of Pisa, Rocking Pagoda, Rope-walker, heavy bottoms of hydrometers, ballast in ships; Rocking toys.
- 14. Pendulum, Isochronism. Toothed wheel and escapement. Working of a pendulum- clock.
- 15. Fahrenheit, Centigrade and Réamur's scales. Clinical thermometer. Thermograph. Maximum and minimum thermometers Construction of thermometers.
- 16. Expansion due to heat, and its effects. Fixing tyres to wheels. Bursting of pneumatic tyres by heat. Unequal expansion of different solids and liquids. Expansion of gases. Co-efficient of expansion. The exceptional behaviour of water. Sudden heating or

cooling of glass vessels. Effect of heat on the pendulum and on densities of substances.

- 17. Capacities of substances for heat, Specific Heat, measurement of calories; Heat becomes latent when substances melt or vaporize. Evaporation and consequent lowering of temperature. Change of volume when ice melts; Papin's Digester; Dew-point.
- 18. Three states of matter; artificial cooling; cooling mixtures; Cooling by sudden expansion; manufacture of ice; Liquefaction of air.
- 19. Davy. Safety Lamp; Conduction and convection; land and sea breezes; monsoons; ventilation; use of chimneys for lamps and factories; Vacuum flasks; Radiation; Effect on polished and rough surfaces. The reason why mountain tops are covered with snow.
- 20. Watt and Stephenson. Steam engine; Petrol engine, Oil engine, D-valve; the exhaust valve; the erank and the eccentric; the fly wheel; the governor. (Omit other constructional details.)
- 21. Joule and Rumford. Heat, produced by friction of mechanical work. Heat, a kind of energy. Transformation of energy; conservation of energy. Principle of hydro-electric works. Mechanical Equivalent of heat.
- 22. Reflection of light from plane and spherical mirrors; multiple images; Kaleidoscope; Parallel mirrors. Periscope. Relation between the distances and the sizes of images and objects to be demonstrated and to be calculated mathematically. Principal focus; Search light, Reflectors.
- 23. Refraction of light. Sine law and refractive index. Prism and lenses. Relation between the distances and the sizes of the images; Stereoscope. Decomposition of white light. Refer to rainbow.
- 24. The photographic camera; the human eye; long and short sight.
- 25. The simple microscope; compound microscope; simple telescope and optical lanterns. Cinematograph (elementary treatment).
- 26. Lodestone; Magnetic needle; Earth a magnet; Mariner's Compass; Like and unlike poles; Attraction and repulsion; Magnetic induction.
- 27. Electro-Magnets; permanent and temporary magnets; lines of force, Methods of magnetisation.
- 28. Electricity produced by friction; Electroscope; Attraction and repulsion; Induction; Electricity resides on surfaces; Discharge through points. Sparking; conductors and non-conductors. Condensers, Electrophorus, Principles of electric machines.
- 29. Current electricity; difference of electric levels; simple cell, Leclanche, Daniel, Bunsen and Dichromate Cells; dry cell; Accumulator, Electric circuit. What supplies the energy for the flow. Current detector. Galvanometer, Voltameter and ammeter. Resistance and its effects on a current. Ohm's law.
- 30. Effects of electric current. Incandescent lamp; arc lamp; heating apparatus, Joule's Law. Laws of Electrolysis.

[Part II

- 31. Magnetic properties of a coil carrying current; induced currents; transformers; simple dynamo; simple motor; electric bell; Morse instrument. (Elements only; avoid constructional details.)
- 32. Bell's telephone. Microphone. Gramophone. (Elementary treatment).
- 33. Elementary theory of Sound and wave motion. The human ear.
- 34. Reflection of sound; echoes, multiple echoes, whispering galleries.

Physics—(Practical)

- 1. To find the loss in weight of a regular solid suspended in water and to verify by measurement and calculation that the loss is equal to the weight of an equal volume of water.
- 2. To determine the density of regular solids by measurement and that of irregular solids heavier than water by loss of weight in water.
- 3. To find the weight of unit volume of kerosene or a salt solution.
- 4. To find how many inches of water will balance one inch of kerosene.
 - 5. Relation between the load and the extension of an elastic body
 - 6. Bending of a beam. Relation between deflection and weight
 - 7. Centre of gravity of a parallelogram and a triangle.
 - 8. Boyle's Law.
 - 9. Lever; law of moments.
- 10. To compare the readings of the Fahrenheit and Centigrade thermometers and to find the relation between them by a graph.
- 11. To observe the rise in the boiling point of a liquid, as a solution becomes more concentrated.
- 12. To observe the lowering of the melting point of ice when a salt is mixed with it.
 - 13. To prove the law of reflection.
- 14. To determine the focal length of a convex lens by sunlight or an object at a great distance.
 - 15. To study the attraction and repulsion between two magnets.
- 16. To study the attraction and repulsion between two electrified bodies.
- 17. To study the lines of force of a simple magnet and a pair of magnets.
 - 18. To study the heating effect of an electric current.
 - 19. To study the use of a fuse in an electric circuit.
 - 20. To study the effect of heating a magnetized needle.
 - 21. To fit an electric bell.

Chemistry—(Theoretical.)

- 1. Solution (including solution in water and other solvents), filtration, crystallisation, sublimation, evaporation, distillation. Use of these processes in chemical work.
- 2. Physical and Chemical changes; law of the conservation of mass.
- 3. Elements and compounds, atoms and molecules; symbols, formulæ, equations.
 - 4. Composition of air; air is a Mixture.
- 5. Oxygen; preparation, properties and uses. Combustion; oxidation and reduction; formation and classification of oxides.
- 6. Acids and bases; neutralisation; formation of salts; decomposition of salts by heat.
- 7. Composition of water (weight and volume); electrolysis; hard and soft waters; water of crystallisation; hygroscopity; efflorescence and deliquescence.
- 8. Gay Lussac's law of gaseous combination; law of constant, reciprocal, and multiple proportion.
 - 9. Hydrogen; preparation, properties and uses.
- 10. Carbon; different forms of carbon; their properties and uses; allotropy; chemistry of a candle flame; occurrence and properties of carbon monoxide; preparation, properties and uses of carbon dioxide; Role of carbon dioxide in animal and plant life; properties and uses of sodium carbonate, sodium bicarbonate, calcium carbonate and magnesium carbonate.
- 11. Preparation, properties and uses of nitrogen, amonia, nitric acid; properties and uses of sodium and potassium nitrate. Nitrogen cycle in Nature.
- 12. Preparation, properties and uses of chlorine, bleaching powder and hydrochloric acid, properties and uses of sodium, potassium, magnesium and calcium chloride.
- 13. Sulphur: different forms of sulphur; their preparation and properties; uses of sulphur: preparation and properties of sulphur dioxide, sulphur trioxide, sulphuretted hydrogen; elementary ideas about the manufacture of sulphuric acid; its properties and uses; preparation, properties and uses of iron and copper sulphate; properties and uses of magnesium and calcium sulphate.
- 14. Phosphorus; different forms of phosphorus, their preparation properties and uses; occurrence of calcium phosphate in nature, its uses; lucifer and safety matches.
- 15. Elementary ideas about the composition of silica, quartz and sand; properties and uses of glass.
- 16. Manufacture of iron; preparation, properties and uses of cast iron, wrought iron and steel; formation of the oxide of iron (rust); tinned and galvanized iron.
 - 17. Properties and uses of copper and its alloys.

- 18. Properties and uses of aluminium, aluminium oxide (alumina) and clay; manufacture of earthen-ware and porcelain.
 - 19. Properties and uses of magnesium oxide.
- 20. Properties and uses of mercury, oxide of mercury, calomel, corrosive sublimate, mercury sulphide.
- 21. Preparation, properties and uses of quick lime, slaked lime, mortar and cement; properties and uses of plaster of Paris, and calcium carbide.
 - 22. Properties and uses of :-
 - (a) potassium chlorate; borax, potassium permanganate silver halides and iodine.
 - (b) starch, sugar, alcohol, kerosene oil, petrol, iodoform and acetic, citric and tartaric acids.

Chemistry—(Practical)

- 1. To purify common salt obtained from bazaar.
- 2. To prepare fresh water from salt water.
- 3. To separate alum and copper-sulphate by crystallisation.
- 4. To heat pieces of wood in a crucible covered with sand and to examine the contents before and after cooling.
- 5. To examine the flame of a candle and compare it with that of spirit-lamp.
- 6. To examine the products of combustion of a burning candle and compare them with those in your exhalation.
- 7. To heat separately some Zinc, Magnesium, and Sulphur in an open crucible and notice the change.
- 8. To notice the change when a piece of copper, previously heated, is dropped in a test tube containing methylated spirit.
 - 9. To test properties of Oxygen.
- 10. To prepare Carbonic-acid gas by means of chalk and hydrochloric acid and to examine its properties.
- 11. To heat strongly a piece of chalk, to examine the quicklime obtained, and to study the properties of its solution in water.
- 12. To find the effects of an acid on an alkali and to test the nature of the products.
 - 13. To obtain metalic lead from lead-oxide.
- 14. To bleach (i) a coloured piece of cloth with the help of bleaching powder and (ii) a coloured flower with a solution of Sulphurdioxide and water.
 - 15. To study the effects of soap on hard and soft waters.
- 16. To examine the properties of kerosene oil, petrol and alcohol, their volatile nature, use as solvents, effects of ignition, etc.
 - 17. To study the composition of water by electrolysis.

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BOTANY AND ZOOLOGY.

One Paper—(Three Hours)—100 marks.

General.

- 1. Characteristics of living and non-living things.
- 2. A general idea of the cell and the cellular structure of plants and animals.
- 3. Fossil plants and animals (the meaning of the term); how plant and animal fossils are formed and the light they throw on the history of the plant and animal kingdoms.

I. Botany.

- 1. Parts of the body of a typical plant (root, stem, leaf, budflower, fruit and seed) and their functions: striking modifications of these to serve special purposes.
 - 2. Internal structure of plant parts (root, stem and leaf).
- 3. Life-histories of an annual (e. g. Cucumber), biennial (e. g. Carrot) and a perennial (e. g. Mango) plant, to illustrate the process of germination, nutrition, growth, movement and reproduction in ordinary plants.
- 4. Plants showing differences in one or more particulars from the typical plants mentioned previously—A Gymnosperm (Cycad), a Fern, a Moss or Livewort, a mould or Mushroom, an Alga (Spirogyra) and a Bacterium. The different degrees of organization of the plant body shown by this series.
- 5. Classification of plants—Flowering and Flowerless, and the subdivisions of these into Monocotyledons, Dicotyledons, Gymnosperms, Pteridophytes, Byrophytes and Thallophytes. Meaning of the terms Natural order, Genus and Species to be explained by the study of the following plants:—

Cotton, Bhendi; Orange, Lemon; Pea, Gram; Sunflower, Marygold; Brinjal, Chillie, Cocoanut, Arecanut; Rice, Wheat; Tulsi, Subja or Dumro.

6. Plants in their natural habitats: factors (water, light, air and soil) influencing growth of plants; adaptations of structure and mode of nutrition shown by Hydrophytes, Halophytes, Xerophytes, Parasites, Epiphytes, and Insectivorous plants. Means of seed-dispersal.

Practical Work.

Demonstration experiments by the teacher to show differences between living and non-living things; drawing and description of parts of the plant body; internal structure of plant parts to be demonstrated by the teacher; observations on life-histories of the annual, biennial and perennial plants mentioned in the theoretical part; simple experiments to illustrate conditions of germination, nutrition, growth, movement and reproduction to be demonstrated by the teacher.

Observations on such portions of the life-histories of the different kinds of plants (other than ordinary plants) as are possible without

special apparatus; description of the plants mentioned in connection with the classification of plants.

Observation on adaptations shown by plants to different habitats.

Text Books Recommended.

M. J. Legoc.—Introduction to the Tropical Botany.

J. Pfleiderer.—Glimpses into the life of Indian Plants.

M. C. Stopes.—The Study of Plant Life.

II. Zoology.

1. External parts of the following animals:

Cat or dog, pigeon or fowl, snake and lizzard, the frog, a bony fish, butterfly or cockroach, spider, snail, crab, earth worm, sponge and coral.

- 2. Internal parts of animals, illustrated by the frog and the cockroach, paramaecium and amoeba.
- 3. Functions of the external and the internal parts of animals mentioned below:—

Orang-outang, Cat, Hyaena, Dog, Wolf, Bear, Bat and Flying Fox, Hedgehog, Squirrel, Mouse, Porcupine, Hare, Elephant, Pig, Ox, Deer, Camel, Horse, Whale, Ant-eater, Kangaroo.

- 4. General idea of the classification of animals.
- 5. Recognition of the animals mentioned above in (1), (2) and (3) and an elementary knowledge of the life history of the mammals, birds, reptiles, amphibians, fishes, insects, spiders, crustaceans, molluscs, worm and some lower Invertebrates.

Practical Work.

The above syllabus is to be illustrated by the teacher by practical demonstration, lantern slides, charts, models and actual specimens wherever possible.

Text-Books Recommended.

- J. Pfleiderer—Zoology (A book for Indian Students).
- W. Rae Sheriffs—Zoology for Secondary Schools in India.

0. 183.

DOMESTIC SCIENCE.

(One Paper—(Three Hours)—100 marks.)

There shall be one paper of three hours carrying 100 marks, of which not more than one third shall be reserved for Physics, Chemistry and Plant and Animal life and the rest for the remaining topics of the syllabus.

The syllabus is such as can be taught in four academic years with three periods of 45 minutes per week.

Teachers are expected to group together practical lessons so as to secure co-ordination between theoretical and practical work.

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Teachers may teach any portion of the syllabus at any time during the four years' period. The distribution given below is, however, suggested for those schools which would have a uniform plan, to avoid inconvenience to the pupils migrating from one school to another.

STANDARD IV.

Elementary Plant Life and Animal Life.

Difference between living and non-living matter. What is a cell? Air and Sunlight and their effect on the growth of plants.

Nourishment and manuring of plant; how nourishment is absorbed and utilised.

Structure of the flowers—fertilization. Nature's methods to secure fertilization.

Propagation of plant life by methods other than that of seed germination; runners; cuttings; grafting.

Physiology.

Systems of human body.

The Circulatory system—The nature of blood and its circulation heart and lungs; arteries, veins and capilaries.

The lymph and lymphatic system.

The respiratory system—Lungs, breathing; pure and foul air; larynx and voice production.

The Digestive system; liver, how food is digested; types of food easy or difficult to digest; nutrition.

The Excretory system—waste products of the body, function of kidneys; spleen; skin and perspiration; baths.

Hygiene.

The value of exercise and rest; rules to be observed in exercise; fresh air, recreation, sleep.

Supply of pure water from wells, rivers, tanks to cities.

Drinking water, its filteration, chlorination and storage.

Disposal of refuse.

STANDARD V.

Elementary Plant and Animal Life.

Amœba—One celled animal, multiplication by fision, nucleus, unsteady form.

Fish—form adopted to life under water, modified breathing apparatus.

Frog-Tadpole; can live under water as well as outside.

Silkworm—Metamorphosis.

Fabrics.

Cloth as used in clothing and for articles of household use; the chief fibres; cleaning household chemicals for cleaning, and their uses.

Comparison of cloth made out of different fibres for (a) use, (b) durability, (c) beauty, (d) cost. The making and repairing of cloth and clothes. Sorting of clothes and removal of stains. The washing, cleaning and ironing of cloth goods.

Hygiene.

Site of house; air, ventilation and light; house water supply and drainage; lighting and sanitation.

Simple cases of enzyme action; curds, starch, sugar; vinegar; alcohol; bad effects of alcohol, tobacco, bhang and opium.

Chemistry.

Elements and compounds.

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Composition of air; combustion; Oxidation; properties of oxygen.

General properties of acids and bases.

Composition of water (qualitative).

Hard and soft water. Methods to make hard water soft.

Carbonic acid gas and its properties; its presence in air; its relation to plant life and animal life; danger of carbon monoxide poisoning.

Physics.

Mechanics.—Liquids in communicating vessels; water supplies to cities; working of the syringe; cycle pump; Primus Stove, siphon (ordinary).

Heat.—Clinical thermometer—a maximum thermometer; use of a Clinical thermometer.

Expansion caused by heat; its effects; effects of sudden heating or cooling on glass vessels.

Cooling mixtures; increase in volume when water solidifies.

Conduction and convection; humidity and evaporation; ventilation; use of chimneys for lamps and factories; vacuum flasks.

Effect of pressure on boiling water; pressure cooking.

Evaporation and consequent lowering of temperature; factors that regulate evaporation.

Practical Work.

- 1. Cutting out and making two simple garments, one for a child and one for an adult; repairing of clothes.
- 2. Sorting, washing, blueing, starching, ironing and folding of clothes. (Each pupil should wash and iron a woollen vest, a cotton polka, a shirt and a child's silk frock.)
- 3. Removing of stains from fabrics.
- 4. Cleaning and polishing glass, wood, marble tiles, and metal wares.

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STANDARD VI. Physiology.

The bony system—the skeleton; composition of bones, cartilage. Structure of muscles; types of muscles; joints.

The nervous system—The brain and nervous chord (very elementary treatment).

The glandular system—The most important glands and their functions.

The teeth and their care; the eyes and their care; the ears and their care; the hands, feet and hair, and their care.

Hygiene.

Purchase of food material and its preservation.

Food and nutrition. Different food constituents-proteins, carbohydrates and fats; vitamins; mineral salts; the functions of each in the body. The different food materials in which they are found; errors of diet. Milk and milk products. Amount and nature of food used for infants, children, adults and invalids. Rate of growth in children. Comparative heights and weights.

Cookery—The object of cooking food. Different methods of cooking. Principles to be observed in the cooking of food containing proteins, carbohydrates, fats, vitamins and mineral salts. Preparation of typical dishes. Preservation of food. Use of preservatives. Drying, Bottling.

Yeast, moulds and bacteria as affecting a household.

Tables of weights and measures.

Chemistry.

Properties and uses of bleaching powder, sodium bicarbonate, sodium carbonate; quick lime; slaked lime and lime water. Properties and uses of iron; rust, tinned iron, galvanized iron, steel.

Properties and uses of copper.

Qualitative composition of (alloys) brass, bronze, german silver, gold and silver coins, solder. Alloys of gold, 9 ct. and 18 ct. gold; rolled gold.

Physics.

Light.—Reflection and refraction of light from plane surfaces; use of a lens as magnifier.

Magnetism and Electricity.—

Conductors and non-conductors.

Current electricity; Difference in electric potentials; simple cell; dry cell.

Electric circuit. Effects of electric current; incandescent lamp; heating apparatus.

Meaning of the words volts, ampere; unit of electricity-measurement; Electro-magnets; Electric bell; short circuit; fuses; electric hocks.

Practical Work.

- 1. Each pupil should prepare at least some products of milk-cream, butter, ghee, dahi, chhas, mava; and one kind of bread, one cereal dish, one pulse dish, one fruit dish, two vegetable dishes, one kind of sweetmeat; one kind of preserve, chutney or pickle.
- 2. Use of a balance; weighing and measuring.
- 3. Bandaging.

STANDARD VII.

Health of the Home.

Household pests such as the house fly, mosquito, flea, cockroach, rats, mice, white ants, moths spiders, etc.; conditions favouring their multiplication and spread; diseases they spread; how destroyed.

Epidemics; how, caused and controlled; preventive measures to be taken for control of contagious diseases such as small pox, measles, typhoid, diptheria, cholera, plague and communicable diseases such as tuberculosis; vaccination, disinfection, inoculation.

Use of the clinical thermometer.

Preparations of lotions in common use, such as Boric lotion, Condy's fluid, saline solution, and their strengths.

Disinfection of persons, clothing and appliances.

Infant Welfare.

The management of the new born baby. The care of the eyes.

Umbilicus, skin and buttocks, temperature, the common diseases of the new born baby and their detection. Nursery equipment, bathing, clothing, fresh air, sunlight, rest, exercise. Nutrition of infants and regulation of habits. The advantages of breast feeding to the infant. Hours of feeding, the overfed baby and the underfed baby. The importance of sunlight on nutrition and of weighing babies regularly.

Composition of Human milk and Cow's milk, and their comparison. Importance of milk drawn from a healthy cow in clean utensils and with clean hands. Testing of milk (with hydrometer) and its care in the home. Determining factors for artificial feeding or complementary feeding. Pasteurisation and preparation of artificial feeding for normal and premature babies.

Common errors in management of infants:—Evil effects of doping children with opium or bala goli, of putting dummies into the mouth, of allowing children to eat sweetmeats contaminated with flies and dust, of irregular feeding, of keeping the children not clad and exposed to draughts, of using unclean clothes and of keeping the home and surrounding unclean and ill-ventilated.

First Aid:—Practising first aid in common ailments and accidents, such as bleeding, wounds, burns, electric shocks, accidental poisoning, fits, drowning, entrance or removal of foreign bodies,

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poisonous bites of animals and insects, common injuries; dressing and bandaging.

Household Accounts and Management:—The management of money, income, budget making, accounts keeping, wise purchasing, co-operative stores, banking, insurance, debt. Arrangement of work for the day, the month, the year. Convenience in working.

Practical Work.

- 1. Bed-making, preparation of baths, use of sponge.
- 2. Using and reading a Clinical thermometer, preparation of lotions in common use such as a Boric lotion, Condy's fluid, Saline solution and their strengths.
- 3. Preparation of infants' food and invalid cookery, such as barley water, albumen water, conjees.
- 4. Testing (with a hydrometer) and care of milk.
- 5. Keeping records of weights and heights of selected children during a given period.
- 6. Keeping a sick room chart.

0. 184.

PHYSIOLOGY AND HYGIENE.

One Paper—(Three Hours)—100 marks.

There shall be one paper of three hours carrying 100 marks of which 60 marks shall be reserved for Anatomy and Physiology and 40 marks for Hygiene.

As far as possible, qualified medical men should be employed to teach Physiology and Hygiene in the schools which send up candidates for the Matriculation Examination.

Teachers are at liberty to teach any portion at any time during the period of four years but in order to secure co-ordination between different schools, it is recommended that the following plan be adopted:—

As regards practical work the teachers in the subjects should give, as far as possible, practical demonstrations.

STANDARD IV.

Physiology.

I. The Animal Cell.

Nucleus, Cytoplasm.

Amoeboid movement, Ciliary movement, Cell division.

Characteristics of living things. Animal evolution.

Differentiation and life history of man.

- II. The Circulatory System.
 - (a) Blood:—Red and white blood corpuscles; Plasma. Clotting of blood, serum, defibrinated blood. Arterial and venous blood.
 - (b) Lymph:—Its composition and formation, Lymph glands and spleen. The flow of lymph.

- (c) The heart:—Its structure. The auricles and ventricles. Systole and diastole. Rate of heart beat. Heart sounds. Cardiac nerves.
- (d) The blood vessels:—The arteries, veins and capillaries.
 Their structure and functions. Blood-pressure. Vasomotornerves. Portal circulation, Pulmonary circulation.

III. Respiratory System.

The structure of nose, pharynx, larynx, Trachea, bronchi and lungs. Thorax and its movements. Rate of breathing. Composition of inspired and expired air; exchange of oxygen and carbon dioxide in the lungs and tissues. The Respiratory centre.

Pure and foul air. Value of proper ventilation.

Hygiene.

I. Ventilation.

Composition of air, Impurities of air: systems of ventilation; artificial ventilation and natural ventilation; Floor space.

Effects of over-crowding-Effect of ventilation on health and disease.

II. Water.

Sources of water supply—wells, tanks, rivers, artificial lakes.

Common impurities and methods of purification. Diseases conveyed by water.

STANDARD V.

Physiology.

I. The Digestive System.

Food:—Proteins, Fats, Carbohydrates, Mineral salts. Water, Vitamins. Amount of food required in health.

Digestion:—Mouth, Tongue, Teeth. The salivary glands and their digestive action. Digestion and absorption in stomach, small and large intestines, (Gastric Juice. Bile, Pancreatic Juice, Succus, Physiology of liver and Pancreas).

Nutrition:—Metabolism of Proteins, Fats and Carbohydrate. Heat production and heat loss. Body temperature.

II. Excretory System.

The Kidneys. Secretion and composition of urine. The sweat-secretion.

Structure and function of skin, hair and nails.

Hygiene.

I. Food.

Its composition and nutritive value. General uses of food. Build of the body and its relation to food. Classification of food—special uses of each class.

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Nitrogenous foods:—Milk, eggs, cheese, meat, fish, game, etc.

Cereals and leguminous foods.

Fats and carbohydrates.

Green vegetables, fruits, nuts, condiments, and mineral salts. Beverages.

Preparation of food and object of cooking.

II. Clothing.

Its uses and properties. Materials used for clothing. Errors in clothing.

Skin and personal cleanliness. Washing and bathing.

STANDARD VI.

Physiology.

I. The Skeletal and Connective Tissues.

The principal bones of the body, the structure, cartilage and composition of bones. Joints.

II. The Muscular System.

Principal muscles of the body:—The structure and functions of the voluntary and involuntary muscles.

Levers, how muscles act-Standing and walking.

III. The Nervous System.

The Nerve cell. The nerves (Cranial and spinal.) The spinal cord and the brain.

Reflex action. Some common reflexes such as kneejerk, Conjunctival reflex, etc.

Physiology of Cerebrum, Cerebellum and the Medulla oblongata. The Autonomic nervous system.

Hygiene.

I. Buildings.

Situation, soil, cubic space.

II. Disposal of Refuse.

Sewers, drains, traps, water closet. Incinerators. Manure.

III. Lighting of Building.

Effect of light on health and disease.

IV. Rules of Health.

Laws of health—concerning (a) Food, (b) Need of pure air (c) Clothing, (d) Exercise and rest, (e) Influence of habits (f) Cleanliness and health.

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EXAMINATIONS

STANDARD VII.

Physiology.

I. The Special Senses.

The Structure and functions of the eye, and the ear. The taste, smell and cutaneous sensations.

II. The Ductless Glands.

The thyroid, the Pituitary Body, the Suprarenal body. The Islets of Langerhans (Pancreas). The Ovary and the testes.

Hygiene.

I. Infectious diseases.

Cholera, Plague, Malaria, Small Pox, Typhoid, Dysentery, Leprosy, Scabies, Ringworms and Trachoma. (Their common signs and symptoms.)

Their cause and mode of spread.

Methods of prevention, personal and general.

Management of an infectious case.

Flies, mosquitoes, bugs and lice, and the part they play in the spread of disease.

Disinfectants and antiseptics.

Hints about first aid and home nursing.

0. 185.

ARITHMETIC.

One Paper—(Three Hours)—100 marks.

Simple and compound rules, vulgar and decimal fractions, including simple ideas of recurring decimals, proportion, metric system, simple problems on direct exchange, interest and discount (True and Banker's), stocks and shares, profit and loss, square root; areas of a triangle, a parallelogram and a circle; volumes and surfaces of a rectangular solid, a cone, a cylinder and a sphere. Use of four figure logarithmic tables in multiplication and divison.

Note.—Examples of a difficult nature or involving lengthy arithmetical processes shall not be set.

0. 186.

ADDITIONAL PAPER IN ENGLISH.

One Paper—(Three Hours)—100 marks.

Texts in prose and poetry for rapid reading and/or detailed study will be prescribed from year to year. A list of passages from both will be annually published and candidates will be required to reproduce from memory passages of poetry not exceeding twenty verses and of prose not exceeding 250 words.

The paper will consist of two sections. The first containing questions on the prescribed poetry, the second on the prescribed prose. In each section there will be one question in answering which candidates will have to reproduce passages from memory. The questions on the text will test the candidates' knowledge of the general contents of the works prescribed and also the precise meaning of specific passages from these works. Some of these questions may deal with matters grammatical or rhetorical.

F. Y. A. : SYLLABUS

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BACHELOR OF ARTS.

GENERAL.

0. 195.

Candidates for the Degree of Bachelor of Arts must have passed the Matriculation Examination, and will be required to pass two subsequent examinations, the first to be called the Intermediate Examination in Arts, and the second the examination for the Degree of Bachelor of Arts. Texts and periods of study will from time to time be prescribed by the Academic Council, and text-books recommended by it where it is deemed desirable.

(2) FIRST YEAR'S COURSE IN ARTS.

0. 196.

During the first year, there shall be no University Examination for a candidate proceeding to a Degree in Arts. Such a candidate will be permitted at the end of the First Year to enter on a course for the Intermediate Examination in Arts: provided that he produces a a certificate from the Principal of an Arts College showing that he has kept two terms at a College or Colleges affiliated to the University and has satisfactorily carried out the work appointed by the University for the first two terms in Arts, and has satisfactorily gone through the course of Physical Training prescribed by the Syndicate, from time to time, unless exempted on the ground that he is medically unfit to undergo such exercise, or that he is a member of the University Training Corps or that he has been regularly taking part as a member of the College Team in the recognized fixtures of the major games.

In order to go through a course of Physical Training satisfactorily, the student shall have attended the Physical Training Class of his College, for at least three-fourths of the possible number of periods.

0. 197.

Heads of Colleges are empowered to charge for each candidate who applies to be examined a fee of not more than Rs. 10. The Head of each College shall also collect and forward to the Registrar of the University a fee of Rs. 10 for each candidate who has been certified and shall submit the names of all the candidates who have been certified in accordance with the above Ordinance (Ordinance 196) and the names of such candidates shall be registered by the University.

R. 6.

The following are the subjects appointed by the University for the first two terms in Arts:—

- 1. English.
- 2. (a) A Classical Language or a Modern European Language.
 - (b) Composition in English or in a Modern Indian Language.
- 3. Indian Administration.
- 4. (i) Geography,
 - (ii) World History,
 - (iii) Mathematics.

Syllabus.

R. 7. 1. ENGLISH.—(Two papers of three hours each, carrying 100 marks each).

There shall be two papers of three hours each, one in Prose, and the other in Poetry, carrying 100 marks each. The paper in Poetry shall be on prescribed texts. The paper in Prose shall also be on prescribed texts, and shall include an essay based thereon, carrying 25 marks.

R. 8.

2.—(a) A CLASSICAL LANGUAGE or a MODERN EUROPEAN LANGUAGE, and (b) a paper in Composition in English or in a Modern Indian Language.

(Two papers of three hours each, carrying 100 marks each.)

(a) A Classical Language or a Modern European Language.

One of the following :-

Sanskrit. Hebrew. Avesta and Pahlavi. Ardha-Magadhi. Greek. Arabic. Persian. Pali.

Latin. French. German. Portuguese.

Candidates will be examined in prescribed texts.

The paper shall contain unseen passages for translation both out of that language into English and vice versa, and such passages shall together carry at least 30 per cent. of the total marks. It will also contain questions in Grammar, as well as in the matter of the books prescribed (including passages for translation and explanation).

(b) COMPOSITION in ENGLISH or in a MODERN INDIAN LANGUAGE*

Books will be prescribed.

The paper shall contain exercises in composition based on books prescribed for general reading, and shall test the candidate's ability to express himself correctly and idiomatically in the language, on the subject-matter of the books prescribed. The Paper in the Modern Indian Language shall also contain an essay which has no bearing on the prescribed texts.

R. 8A.

3. INDIAN ADMINISTRATION.—(One paper of three hours carrying 100 marks.)

There shall be one paper of three hours carrying 100 marks, based on the following syllabus:—

Indian Administration :-

The Secretary of State for India. The Government of India. The Provincial Governments.

District Administration. Village Organization.

*The Modern Indian Languages shall mean and include the following:—
1. Marathi. 2. Gujarati. 3. Urdu. 4. Kannada. 5. Sindhi. 6. Hindi.

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Legislative Councils.
Municipal and Local Self-Government.
Finance.
Land Revenue.
Law and Justice.
Police and Jails.
Education.

R. 9.

4. (i) GEOGRAPHY; or (ii) WORLD HISTORY; or (iii) MATHEMATICS.

(Two papers of three hours each, carrying 100 marks each.)

(I) GEOGRAPHY.

The papers shall be based on the following syllabus:—

PAPER I.

The Earth as a planet; its motions; the seasons; the measurement of time; calendars and the principle of intercalation.

Latitude and Longitude; their determination.

Map-reading and easy map-making from data supplied. Easy projections.

Rocks and their chief types, their influence on soil and vegetation.

Mountain Building. Land forms.

Exercises on climate.

Vegetation regions as influenced by climate.

Animal kingdoms as influenced by climate and vegetation.

Man in relation to his environment, his race, habitation population movements, habits and customs.

Progress of countries as influenced by geographical conditions.

The standard of works and the manner of treatment should be as in—Miss Skeat (Mrs. Wood):—

Principles of Geography (Clarendon Press, Oxford);

Simmons and Stenhouse:-

Class Book of Physical Geography (Macmillan.)

PAPER II.

Detailed study of :-

(i) Countries in intimate relation with India: Afghanistan, Iraq, Persia, Ceylon, British Malaya, the East Indies, China and Japan, South and East Africa.

and

(ii) one of the following regions:-

(a) the Deccan and the Konkan;

(b) Karnatak;

(c) Gujarat and Kathiawar;

(d) Sind.

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R. 91.

(II) WORLD HISTORY.

N. B.—No book is specially recommended as a class text-book.

The two papers in World History will be devoted to ancient. mediæval and modern periods. The scope of study and the treatment of the subject should be on the lines indicated by the following books:

- J. H. Breasted The Conquest of Civilization J. H. Robinson ••• The Ordeal of Civilization
- **...** Will Durant The Story of Civilization
- A. Sheppard & N. D. Godfry A Survey of Civilization

(in two parts).

R. 9B.

(III) MATHEMATICS.

There shall be two papers, one on Algebra and the other on Geometry and Trigonometry, or in the alternative, two papers on Descriptive Mathematics, based on the Syllabus prescribed.

Paper I.-Algebra.

Indices, surds, logarithms with applications. Quadratic equations, simultaneous equations involving quadratics and graphical illustrations. Definition and use of simple determinants of second and third orders. Quadratic expressions and graphs. Remainder theorem. Progressions. Simple Permutations and Combinations. Summation of squares and cubes of natural numbers. Binomial theorem for a positive integral index.

Paper II.—Geometry & Trigonometry.

GEOMETRY.

The questions in Practical Geometry shall be set on the constructions contained in Schedule A, together with easy extensions of them as riders if desired. A candidate should provide himself with a ruler graduated in inches and tenths of an inch and in centimeters and millimeters, set-squares, a protractor, compasses and a hard pencil. All figures should be drawn accurately.

The questions on Theoretical Geometry shall consist of theorems contained in Schedule B, easy deductions from them and arithmetical illustrations. Any proof of a proposition shall be accepted which forms a part of any systematic treatment of the subject; the order in which the theorems are stated in Schedule B is not imposed as the sequence of the treatment. Only proofs which are applicable to commensurable quantities shall be expected. The use of intelligible abbreviations is recommended.

SCHEDULE A.

Division of straight lines into parts in any given proportions.

Construction of a triangle or a square equal in area to a given polygon.

Construction of common tangents to two circles.

Simple cases of construction of circles from sufficient data.

Construction of a fourth proportional to three given straight lines and of a mean proportional to two given straight lines.

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Construction of a regular pentagon.

Description in a given triangle of a triangle similar and similarly placed to another given triangle.

Description of squares in a triangle.

SCHEDULE B.

Proportion: Similar Triangles.

The internal and external bisectors of an angle of a triangle divide the opposite side internally and externally respectively in the ratio of the sides containing the angle.

The rectangle contained by the diagonals of a quadrilateral inscribed in a circle is equal to the sum of the rectangles contained by the two pairs of opposite sides.

The ratio of the areas of two similar polygons is equal to the ratio of the squares on corresponding sides.

If two triangles (or parallelograms) have one angle of the one equal to one angle of the other, their areas are proportional to the areas of rectangles contained by the sides about the equal angles,

Concurrency and Collinearity.

If three concurrent straight lines are drawn from the angular points of a triangle to meet the opposite sides, the product of three alternate segments taken in order is equal to the product of the other three segments.

If a transversal is drawn to cut the sides or the sides produced of a triangle, the product of three alternate segments taken in order is equal to the product of the other three segments.

In any triangle the three middle points of the sides, the three feet of the perpendiculars drawn from the angular points on the sides and the three middle points of the lines joining the orthocentre to the angular points all lie on a circle whose diameter is equal to the radius of the circumscribed circle and whose centre is the middle point of the line joining the orthocentre and the circumcentre.

If from any point on the circumference of a circle, perpendiculars be drawn to the sides of an inscribed triangle, the three feet of the perpendiculars lie on straight line.

Radical Axis.

Determination of the locus of points from which tangents drawn to two given circles are equal.

The radical axis of three circles taken in pairs are concurrent. Construction of the radical axis of two given circles.

TRIGONOMETRY.

Circular Measure.

Orthogonal projection as far as is required for defining trigonometric functions of any angle.

Trigonometric functions of any angle. Simple trigonometric equations. Inverse trigonometric functions. Addition formulæ for two angles. Graphs of $\sin \theta$, $\cos \theta$, etc.

The formulæ relating to triangles leading to solution of triangles, formulæ relating to radii of circles connected with triangles, and formulæ for $\tan \frac{A}{2}$, etc.

Use of Trigonometric and Logarithmic Tables.

Solution of triangles with simple two dimensional problems in heights and distances.

ALTERNATIVE COURSE.

DESCRIPTIVE MATHEMATICS.

Paper I

The general quadratic. Logarithms. Graphs of $y=x^n$ for rational value of n, and of $y=a^x$, for a>0, with applications, Graphs of $y=ax^m+bx^{m-1}+cx^{m-2}+\dots+k$.

Averages. Frequency distributions. Empirical probability. Binomial theorem for a positive integral index. Evalution of determinants. Simple standard derivatives and elementary integrals with applications.

Paper II

Paper II.—Slide scales. Similarity of triangles. Inversion. Nomograms. Graphical rulings—the determination of empirical formulæ. Graphical solution of equations. The radian. Circular functions and their graphs. Solution of triangles and simple two-dimensional problems. Addition, formulæ.

The scope of the syllabus, as far as Graphs and Statistics are concerned, is indicated in Maclean: Graphs and Statistics, omitting pp 64-67, 93-103, 178-194. Maclean: Descriptive Mathematics may also be consulted.

Regulation 10 has been deleted.

R. 10.

(3) INTERMEDIATE EXAMINATION IN ARTS. (OLD RULES)*
(For 1938-1939 only.)

Admission.

- No candidate will be admitted to this examination unless, after obtaining a certificate from the Principal of an Arts College showing that he has satisfactorily carried out the work appointed by the University for the first two terms in Arts, he shall have kept two terms at a College or Institution recognized in Arts, and unless he produces satisfactory testimonials in the prescribed form.
- 0. 199. Candidates must forward their applications to the Registrar on or before the 20th February accompanied by certificates of attendance

^{*}The last examination under the old regulations will be held in March 1939.

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during the first term. Certificates of attendance during the second term should be forwarded by Principals of Colleges on or before the 10th March.

R. 11.

Candidates will be examined in the following subjects:-

I. English.

II. Second Language.

III. Indian History and Administration.

IV. Mathematics or Logic.

Syllabus.

I.—English.—Three Papers.

R. 12.

There shall be three papers of two hours each, two on prescribed texts carrying 80 marks each, and one for composition carrying 90 marks, which shall comprise an essay carrying 45 marks and exercises in composition based upon books prescribed for general reading which shall test the candidate's power of writing correct and idiomatic English. The first two papers will contain questions of a grammatical kind as well as questions on the subject matter of the books. The poetry paper will contain at least one question of a more general kind on the poetic art illustrated in one or other of the texts; and the prose paper will contain at least one question involving elementary principles of composition. Some knowledge of the life and literary productions of each author is expected.

The Academic Council, on the recommendation of the Board of Studies, will prescribe texts at least one year before the examination.

Each student shall write at least *eight* exercises in English Composition in class to the satisfaction of his teacher during the year.

II.—Second Language.—One Paper of 100 Marks.

R. 13.

One of the following :-

Sanskrit. Greek. Latin.	Hebrew. Arabic. French.	Portuguese. Avesta and Pahlavi.	Pali.* Persian. German.	Ardha- Magadhi.†
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Candidates will be examined in books prescribed by the Academic Council, on the recommendation of the Board of Studies, at least one year before the examination.

The paper in Second Language will contain unseen passages for translation both out of that language into English and vice versa and such passages shall together carry at least 30 per cent. of the total marks. It will also contain questions on Grammar, as well as on the matter of the books prescribed (including passages for translation and explanation).

^{*} Subject to the condition that a candidate taking this language has passed in Sanskrit or Pali at any preceding examination conducted or recognized by this University.

[†] Subject to the condition that a candidate taking this language has passed in Sanskrit at any preceding examination conducted or recognized by this University.

R. 14. III.—Indian History and Administration.—One paper of 100 marks.

History of the Indian Administration from 1757 to 1927.

Indian Administration (to be studied with the Government of India Act, 1935).

The Secretary of State for India and his Council.
The Government of India.
The Provincial Governments.
District Administration.
Village Organization.
Legislative Councils.
Municipal and Local Self-Government.
Finance.
Land Revenue.
Law and Justice.
Police and Jails.
Education.
Medical Relief and Sanitation.
Public Works.
Famine and Famine Relief.

R. 15. IV.—MATHEMATICS or Logic.—Two papers (of three hours each) of 100 marks each.

(A) MATHEMATICS.

There shall be two papers of three hours each distributed as under:

Paper I.—Analytical Geometry and Solid Geometry,

OR.

Statistics and Nomograms.

Paper II.—Calculus and Mechanics.

Paper I.

ANALYTICAL GEOMETRY AND SOLID GEOMETRY.

Analytical Geometry (Rectangular axes only).

Meaning of a graph. Equations of a straight line, of a pair of straight lines, and of a circle. Equations of the parabola, ellipse and hyperbola (referred to their principal axis). Simple tangent and normal properties of these curves. Properties relating to parallel chords, pairs of tangents, etc., to be omitted except for circles. Geometrical proofs may be given but are not obligatory in the examination.

Solid Geometry.

Elementary properties of lines, planes, pyramids, prisms, cones, cylinders, and spheres. Surfaces and volumes of parallelopipeds, pyramids, cones, cylinders and spheres, by Calculus methods wherever possible.

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Alternative Course (to Paper I)

STATISTICS AND NOMOGRAMS.

Statistics: An elementary treatment of interpolation, probability and random sampling, goodness of fit, types of frequency distributions, correlation and periodicity in time-series.

Nomograms: The representation of formulæ by alignment diagrams. Theory of triangular plottings generalized.

Paper II.

CALCULUS AND MECHANICS.

Calculus.

Simple ideas and properties of limits along with the general notions and simple properties of continuous functions with graphical explanation where possible, but without rigorous proofs. Definition of the sum of an infinite series as the limit of S_n , when this limit exists.

Differentiation of simple functions, second differential co-efficient; statements of binomial, exponential, and logarithmic series* and of series for sin θ , cos θ , tan—¹ θ (not to be used for obtaining differential co-efficients); notion of differentials, and its application to numerical approximations; maxima and minima and their discrimination; applications to the tangent and normal properties of simple curves.

Integration as the inverse of differentiation; integration of simple functions; integration by substitution and integration by parts; definition of a definite integral as the limit of a sum (as can be graphically illustrated) and the application to simple cases of areas and of volumes of solids of revolution; uniform and accelerated motion in a straight line.

Elementary Mechanics.

(1) Mechanics of a Particle: Displacements, velocities, accelerations and their composition and resolution (in two dimensions).

Motion in a straight line. Laws of Motion with simple applications.

Composition and resolution of forces at a point (in two dimensions).

Motion of a projectile with cartesian equation of the path.

(2) Plane Statics of a Rigid Body: Composition of parallel forces. Moments. Equilibrium of a rigid body acted on by three coplanar forces. Centres of gravity of simple bodies. Inclined plane.

General: Impulse. Work. Energy. Power.

(Methods of Calculus are allowed).

The scope of the Syllabus in Mechanics is indicated by Loney's Mechanics and Hydrostatics for Beginners:—

Chapters I, II (omit § 36); III, IV, V, VI (omit §§ 63-65); VII, VIII (omit §§ 78-82, § 92); IX (omit all except §§ 107-109); XI (omit §§ 141-146); XII, XIII, XIV (omit §§ 189-190); XV, XVI (omit §§ 218-221).

^{*}These series are to be obtained by assuming the validity of term by term differentiation and integration of infinite series where necessary.

(B) Logic.

Two papers (of three hours) of 100 marks each.

- 1. The nature and scope of Logic and its relation to the other sciences.
- 2. Names and Terms—classification of terms, denotation and connotation of terms.
 - 3. The Predicables.
 - 4. Propositions—their classification and import.*
 - 5. Nature of Inference and the laws of Thought.
 - 6. Immediate Inferences.
- 7. The Syllogism. Nature and rules of syllogistic reasoning. Moods and figures.
- 8. Direct and Indirect reduction of arguments. Enthymeme. Sorites.
 - 9. Hypothetical and Disjunctive arguments. The Dilemma.
 - 10. Probable Reasoning.
 - 11. Definition.
 - 12. Classification and Division.
 - 13. The nature and presupposition of Induction.
 - 14. Empirical Laws.
 - 15. Inductive Methods.
 - 16. Observation and Experiment.
 - 17. Explanation.
 - 18. Hypothesis.
 - 19. Analogy.
 - 20. Fallacies—Deductive and Inductive.

Standard for Passing the Examination.

- R. 16.

 To pass the examination the candidate must obtain 30 per centof the full marks in all the three papers in English (taken together), and 30 per cent. in each of the other subjects. Should a candidate, however, not obtain 30 per cent. of the full marks in one head of passing only, he shall be declared to have passed the examination, if on a review of the candidate's marks, a majority of not less than two-thirds of the Examiners present decide that the candidate should pass: Provided always that no candidate shall so pass unless he obtains at least 40 per cent. of the total marks in all subjects. Those of the successful candidates who obtain 60 per cent. of the total marks obtainable will be placed in the First Class, and those obtaining 45 per cent. in the Second Class.
- R. 17. A candidate who has obtained 40 per cent. of the total marks in any subject may, at his option, be excused from appearing in that subject at a subsequent examination and will be declared to have

*The existential import of propositions or diagrammatic representation of propositions is not to be studied.

Chap. XXXIV.] INTER. ARTS: SYLLABUS (NEW RULES)

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passed the whole examination when he has passed in all the subjects of the examination: Provided that in the subject or subjects in which he appears on the last occasion he must obtain the minimum in each paper or subject required by Regulation 16. Candidates passing the examination in this manner in compartments will not be eligible for a class or for any prize or scholarship to be awarded at the examination.

(3a) INTERMEDIATE EXAMINATION IN ARTS (NEW RULES).*
(In force from 1938).

Admission.

0. 198.

No candidate will be admitted to this examination unless, after obtaining a certificate from the Principal of an Arts College showing that he has satisfactorily carried out the work appointed by the University for the first two terms in Arts, he shall have kept two terms at a College or Institution recognized in Arts, and unless he produces statisfactory testimonials in the prescribed form.

0. 198A. Transitory.

Notwithstanding anything contained in the Ordinances relating to the Intermediate Arts and the Intermediate Science Examinations, a candidate who has been permitted by his Principal to enter on a course for the Intermediate Examination in Science will be permitted at his option to enter on a course for the Intermediate Examination in Arts, provided that he satisfies the Principal on the 4th July, 1938, at an examination to be held in a Classical or a Modern European Language. Such a candidate shall at his risk be permitted provisionally to attend the courses of instruction for the Intermediate Arts Examination from the 20th June, 1938.

0. 199.

Candidates must forward their applications to the Registrar on or before the 20th February accompanied by certificates of attendance during the first term. Certificates of attendance during the second term should be forwarded by Principals of Colleges on or before the 10th March.

R. 11.

Candidates will be examined in the following heads :-

- 1. English.
- 2. (a) A Classical Language or a Modern European Language.

(b) Composition in English or in a Modern Indian Language.†

- 3. Economics and Civics.
- 4. Logic.

 or

 Mathematics.

Syllabus.

R. 12.

1. ENGLISH.—(Two papers of three hours each, carrying 100 marks each.)

There shall be two papers each of three hours' duration and carrying 100 marks, one in Poetry and the other in Prose. The

^{*} The First Examination under the New Rules will be held in March, 1939. † The Modern Indian Languages shall mean and include the following:—

1. Marathi. 2. Gujarati. 3. Urdu. 4. Kannada. 5. Sindhi.

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paper in Poetry shall be on prescribed texts. The paper in Prose-shall also be on prescribed texts, and shall include an essay based thereon, carrying 25 marks.

2. A Classical Language or a Modern European Language, and a paper in Composition in English or in a Modern Indian Language.*

(Two papers of three hours each, carrying 100 marks each.)

(a) A Classical Language or a Modern European Language.
One of the following:—

Sanskrit. Hebrew. Portuguese. Persian. Greek. Arabic. Avesta and Pahlavi. German. Latin. French. Pali. Ardha-Magadhi.

Candidates will be examined in prescribed texts.

R. 13.

R. 14.

The paper shall contain unseen passages for translation both out of that language into English and vice versa, and such passages shall together carry at least 30 per cent. of the total marks. It will also contain questions in grammar, as well as in the matter of the books prescribed (including passages for translation and explanation).

(b) Composition in English or in a Modern Indian Language.* Books will be prescribed.

The paper shall contain exercises in composition based on books prescribed for general reading, and shall test the candidate's ability to express himself correctly and idiomatically in the language, on the subject-matter of the books prescribed. The paper in the Modern Indian Language shall also contain an essay which has no bearing on the prescribed texts.

3. ECONOMICS and CIVICS.—(One paper of three hours, carrying 100 marks.)

There shall be one paper of three hours carrying 100 marks, divided into two Sections carrying 50 marks each, the first Section being on Elementary Economics and the second on Civics, based on the following syllabus:—

ELEMENTARY ECONOMICS (50 Marks).

N. B.—Only elements of the subject with special reference to Indian conditions shall be studied.

General Notions: Eeconomic Welfare. Environment: Geography and Climate. Social and Religious Institutions. The State and Welfare.

Quality and Quantity of Population: Division and Labour: Machinery and Labour.

^{*} The Modern Indian Languages shall mean and include the following:—
1. Marathi, 2. Gujarati, 3. Urdu. 4. Kannada. 5. Sindhi.

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Economic Organisation: Agriculture. Industries. Banks. Joint Stock Companies. Trade and Transport.

Laws of Demand and Supply. Nature and Functions of Money.

National Income and its Distribution. Standard of life.

Public Finance: The raising and spending of Public Revenue.

CIVICS (50 Marks).

The Meaning of Civics. Civics and Life.

Citizenship: The Meaning of Self-Government. Rights and Duties of Citizens.

The State and its Machinery with special reference to Citizenship.

Local Self-Government: Sphere. Function and Machinery. Modes of raising and spending revenue.

Social Institutions: e. g., Marriage and Family. Caste and Classes. Property.

R. 15. 4. LOGIC or MATHEMATICS.

(Two papers of three hours each, carrying 100 marks each.)

(a) LOGIC.

- The nature and scope of Logic and its relation to the other sciences.
- 2. Names and Terms—Classification of terms, denotation and connotation of terms.
 - 3. The Predicables.
- 4. Propositions—their classification and import.*
- 5. Nature of Inference and the laws of Thought.
- 6. Immediate Inferences.
- 7. The Syllogism. Nature and rules of syllogistic reasoning. Moods and figures.
- 8. Direct and Indirect reduction of arguments. Enthymeme. Sorites.
- 9. Hypothetical and Disjunctive arguments. The Dilemma.
- 10. Definition.
- 11. Classification and Division.
- 12. The nature and presupposition of Induction.
- 13. Empirical Laws.
- 14. Inductive Methods.
- 15. Observation and experiment.
- 16. Explanation.
- I7. Hypothesis.
- 18. Analogy.
- 19. Fallacies—Deductive and Inductive.

^{*}The existential import of propositions or diagrammatic representation of propositions not to be studied.

EXAMINATIONS

R. 15A.

(b) MATHEMATICS.

Paper I.—Analytical Geometry and Solid Geometry.

Ol

Statistics and Nomograms.

Paper II-Calculus and Mechanics.

Paper I

ANALYTICAL GEOMETRY AND SOLID GEOMETRY.

Analytical Geometry (Rectangular axis only.)

Meaning of a graph. Equations of a straight line, of a pair of straight lines, and of a circle. Equations of the parabola, ellipse and hyperbola (referred to their principal axis). Simple tangent and normal properties of these curves. Properties relating to parallel chords, pairs of tangents, etc., to be omitted except for circles. Geometrical proofs may be given but are not obligatory in the examination.

Solid Geometry.

Elementary properties of lines, planes, pyramids, prisms, cones, cylinders, and spheres. Surfaces and volumes of parallelopipeds, pyramids, cones, cylinders and spheres, by Calculus methods wherever possible.

ALTERNATIVE COURSE (TO PAPER I.)

Paper I.

STATISTICS & NOMOGRAMS.

Statistics: An elementary treatment of interpolation, probability and random sampling, goodness of fit, types of frequency distributions, correlation and periodicity in time-series.

Nomograms: The representation of formulæ by alignment diagrams. Theory of triangular plottings generalized.

Paper II.

CALCULUS & MECHANICS.

Calculus.

Simple ideas and properties of limits along with the general notions and simple properties of continuous functions with graphical explanations where possible, but without rigorous proofs. Definition of the sum of an infinite series as the limit, of S_n , when this limit exists.

Differentiation of simple functions, second differential co-efficient; statements of binomial, exponential, and logarithmic series* and

^{*}These series are to be obtained by assuming the validity of term by term differentiation and integration of infinite series where necessary.

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of series for $\sin \theta$, $\cos \theta$, $\tan^{-1} \theta$ (not to be used for obtaining differential co-efficients); notion of differentials, and its application to numerical approximations; maxima and minima and their discrimination; applications to the tangent and normal properties of simple curves.

Integration as the inverse of differentiation; integration of simple functions; integration by substitution and integration by parts; definition of a definite integral as the limit of a sum (as can be graphically illustrated) and the application to simple cases of areas and of volumes of solids of revolution; uniform and accelerated motion in a straight line.

Elementary Mechanics.

(1) Mechanics of a Particle: Displacements, velocities, accelerations and their composition and resolution (in two dimensions).

Motion in a straight line. Laws of Motion with simple applications.

Composition and resolution of forces at a point (in two dimensions).

Motion of a projectile with cartesian equation of the path.

- (2) Plane Statics of a Rigid Body: Composion of parallel forces. Moments. Equilibrium of a rigid body acted on by three coplanar forces. Centres of gravity of simple bodies. Inclined plane.
 - (3) General: Impulse. Work. Energy. Power.

(Methods of Calculus are allowed).

The scope of the Syllabus in Mechanics is indicated by Loney's Mechanics and Hydrostatics for Beginners:—

Chapters, I, II (omit § 36), III, IV, V, VI, (omit §§ 63-65); VII, VIII (omit §§ 78-82, § 92); IX (omit all except §§ 107-109); XI (omit §§ 141-146); XII, XIII, XIV (omit §§ 189, 190); XV, XVI (omit §§ 218-221.)

Standard for Passing the Examination.

- R. 16.

 To pass the examination the candidate must obtain 30 per cent. of the full marks in each head. Should a candidate, however, not obtain 30 per cent. of the full marks in one head of passing only, he shall be declared to have passed the examination, if on a review of the candidate's marks, a majority of not less than two-thirds of the examiners present decide that the candidate should pass: Provided always that no candidate shall so pass unless he obtains at least 40 per cent. of the total marks in all subjects. Those of the successful candidates who obtain 60 per cent. of the total marks obtainable will be placed in the First Class, and those obtaining 45 per cent. in the Second Class.
- R. 17.

 A candidate who has obtained 40 per cent. of the total marks in any subject may, at his option, be excused from appearing in that subject at a subsequent examination and will be declared to have

passed the whole examination when he has passed in all the subjects of the examination: Provided that in the subject or subjects in which he appears on the last occasion he must obtain the minimum in each paper or subject required by Regulation 16. Candidates passing the examination in this manner in compartments will not be eligible for a class or for any prize or scholarship to be awarded at the examination.

R. 17A. Transitory.

- (1) The Intermediate Arts Examination according to the Old Regulations will be held for the last time in the year 1939, the texts in English and in the Second Language remaining the same as those prescribed for the year 1938.
- (2) Candidates who are exempted under the Old Regulations from the subjects of English, Second Language, Mathematics or Logic shall be exempted from the corresponding subjects of examination under the New Regulations.

(4)—EXAMINATION FOR THE DEGREE OF B. A.

Admission.

0. 200.

No candidate will be admitted to this examination unless, after passing the Intermediate Examination in arts, he shall have completed the minimum attendance at courses of instruction in the subjects offered by him during four terms in one or more colleges each of which is recognized for the course offered and unless he produces satisfactory testimonials in the prescribed form.

O. 200A.

Students who have passed the B. Sc. Examination of this University will be allowed to take the B. A. (Pass) degree by passing subsequently the Intermediate Arts and B. A. Examinations in one year or one after another in this order. They will not be required to keep terms at a College and may at their option be excused an examination in the following subjects:—

Intermediate Arts:— Mathematics (in the case of those who have passed the Intermediate Science Examination with Mathematics as their optional subject or the B. Sc. Examination in Mathematics and Physics).

B. A.:—Optional subject [in the case of those who have passed the B. Sc. Examination in any of the groups (a) Mathematics (Principal) and Physics, (b) Physics and Chemistry, (c) Botany and Zoology.]

Candidates claiming this exemption at any examination will not be classed or be eligible for prizes at that examination.

O. 200B.

Students who have passed the B. Sc. Examination of this University with Mathematics as their principal subject will be allowed to take the B. A. Honours degree in Mathematics by passing subsequently the Intermediate Arts and B. A. Examinations in the same examination season, or one after the other in this order. They will not be required to keep terms at a College, and may at their option be exempted from passing in Mathematics at the Intermediate Arts, and B. A. Honours

B. A. EXAMINATION

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Examinations. Candidates claiming such exemption will be eligible only for classes at the B. A. (Honours) Examination according to the provisions of Regulation 36, but not for University awards.

0. 201.

A student who has passed in all subjects but one at the Intermediate Arts Examination in conformity with Regulation 17 will be allowed to keep terms and appear for the B. A. Examination after keeping four terms, but will not be declared to have passed this examination under any circumstances, unless he has passed in the remaining subject of the Intermediate Examination held either in a previous or in the same examination season.

0. 202.

Candidates wishing to appear at the April examination must forward their applications to the Registrar on or before the 20th February accompanied by certificates of attendance during the first three terms. Certificates of attendance during the fourth term should be forwarded by Principals of Colleges on or before the 10th March. Candidates wishing to appear at the October (Pass) Examination must forward their applications to the Registrar on or before the 1st September. Certificates of attendance during the fourth term should, if necessary, be forwarded by Principals of Colleges on or before the 30th September.

R. 18.

Candidates will be examined in the following subjects:-

I.—English Language and Literature, with Composition.

II.—One of the following six groups:—

- (a) Languages.
- (b) Mathematics.
- (c) History and Economics.
- (d) Mental and Moral Philosophy.
- (e) Physics and Chemistry.
- (f) Botany and Zoology.

R. 19.

There shall be an Honours Examination in English, Latin, Greek, Sanskrit, Pali, Ardha-Magadhi, Avesta-Pahlavi, Persian, Arabie, Hebrew, German, French, Portuguese, Marathi, Gujarati, Urdu, Kannada, Mathematics, History and Economics, Philosophy, Physics and Chemistry, and Botany and Zoology.

Honours Examination in Languages.

R. 20.

For the Honours Examination in Languages, the papers shall be distributed as under:—

- (X) In English, eight (three Compulsory and five Optional).
- (Y) In Latin, Greek, Sanskrit, Pali, Ardha-Magadhi, Avesta-Pahlavi, Persian, Arabic, Hebrew, German, French and Portuguese, seven papers (four Pass and three Honours).
- (Z) In Marathi, Gujarati, Urdu and Kannada, five papers (two Pass and three Honours).

[Part II.

The Honours papers shall carry 150 marks each.

For the Honours Examination in Languages other than English, related Languages shall be grouped thus:—

- (A) Latin, Greek, German, Portuguese.
- (B) Sanskrit, Pali, Ardha-Magadhi, Marathi, Avesta-Pahlavi, Gujarati, Sindhi, Kannada.
- (C) Hebrew, Arabic, Persian, Avesta-Pahlavi, Sindhi, Urdu.
- (D) English, French, Persian, German, Sanskrit.

Candidates for Honours in English shall take eight papers in English and two in another Language chosen from any one of the four groups (A), (B), (C), (D), or two additional papers in Honours in English in lieu of the two papers in a second language.

Candidates for Honours in a Language selected from group (Y) above, may take all the seven papers in that Language, or five papers in that Language and two in a related Language, or in a Language selected from group (D).

Candidates for Honours in a Language selected from group (Z) above, shall take five papers in that Language and two in a related Language, or in a Language selected from group (D).

Honours Examination in subjects other than Languages.

- R. 21.
- (a) In Mathematics there shall be eight papers—an essay paper carrying 80 marks, and seven papers carrying 110 marks each.
- (b) In History and Economics and in Philosophy there shall be four Pass papers carrying 100 marks each and three Honours papers carrying 150 marks each.
- (c) In Physics and Chemistry, Botany and Zoology, the papers at the Honours Examination shall be identical with those set at the B. Sc. Subsidiary Examination in the same subject.
- R. 22. Candidates who offer Modern Indian Languages will have the option of answering all the questions in the papers on these languages except the one for translation into English in the Modern Indian Languages which they offer.
- For the Pass Examination, there shall be two papers in Optional English and two in each of the other languages, and four in each of the subjects, Mathematics, History and Economics, and Philosophy; each paper in Persian, French and German carrying 85 marks and each of the other papers 100 marks. In groups (e) and (f) there shall be two papers and two practical examinations in each of the two subjects of either group. In group (e) or (f) for the Pass Examination there will be 75 marks for each Paper and 25 for each Practical.

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ENGLISH.

I.-Compulsory English.

R. 24.

- I .- Compulsory English .- Three papers of three hours each.
 - Paper I.—Two Plays of Shakespeare for detailed study. The Academic Council, on the recommendation of the Board of Studies, will change one of the plays each year.
 - Paper II.—A work of poetry and one of prose of the period after 1780 or selections from a poet and a prose writer of the same period. The Academic Council, on the recommendation of the Board of Studies, will change one text each year.
 - Paper III.—Four modern texts* for general reading in illustration of present day English life and thought of which one at least shall consist of verse, and one of essays. The Academic Council, on the recommendation of the Board of Studies, will change half the texts each year.

Papers I and II will each carry 80 marks. Paper III will carry 90 marks and will comprise an essay of 30 marks.

English (Pass Examination)

R. 25.

- II.—Voluntary Pass.—There will be two papers, each of three-hours, carrying 100 marks each as under:—
 - Paper I. A general survey of the History of English Literature from the Renaissance to the death of Tennyson. The candidates are expected to show familiarity with the more important works of Bacon, Milton, Dryden, Pope, Fielding, Johnson, Wordsworth, Shelley, Dickens and Tennyson.
 - Paper II. Four representative texts in prose and verse to be chosen from year to year by the Board of Studies.

Additional English for Honours.

- III.—Three additional Papers for Honours in English of three-hours each. Each of these papers will carry 150 marks.
 - Honours Paper I. Principles of Literary Criticism and of Prosody. Text books will be prescribed from time totime.
 - Honours Paper II. The special study of two Forms of Literature, each with two illustrative texts. The following forms will be taken in alternate years:—
 - (a) Drama: Tragedy or Comedy,
 - (b) Narrative: The Epic or the Novel.

Honours Paper III. Chaucer: the Prologue and one of the Canterbury Tales to be read in alternate years.

^{*} Modern texts are defined to mean works published in or after 1822.



Extra English Papers in lieu of a SECOND LANGUAGE.

IV.—Two Extra Additional Papers in lieu of two papers in a Second Language. Candidates will be required to secure at least 25 per cent. marks in the total of these papers. These marks will not be added to the *Honours* total, but the taking of these two papers will exempt a candidate from taking two Pass Papers in another Language.

Extra Additional Paper 1. A Historical Study of the English language, with elementary philology from text books to be prescribed, or a survey of the work of some of the great European writers who have influenced English Literature.

This paper will be of three hours and will carry 100 marks.

Extra additional Paper II. A study of the Social History of England from the age of Chaucer to the end of the Victorian period from text books to be prescribed. The study will be social and literary rather than economic and political.

This paper will be of three hours and will carry 100 marks.

Languages other than English.—(Pass Examination.)

N. B.—Candidates for the Pass Degree must offer four papers two in each of the two languages selected from below:—

Latin, Greek, Sanskrit, Pali, Ardha-Magadhi, Avesta-Pahlavi, Persian, Arabic, Hebrew, German, French, Portuguese, Marathi, Gujarathi, Sindi, Urdu, Kannada.

In all languages other than English, books both of prose and poetry will be prescribed and the papers will contain unseen passages for translation both out of the language into English and vice versa, provided that translation from English into the Modern Indian Language shall be made compulsory, and, in the case of Persian, French, Marathi, Gujarati, Kannada, Urdu, Sindhi and Portuguese, exercises in composition, and this work (including unseen translation and composition) shall together carry at least 30 per cent. of the total marks. The papers will also contain questions of a critical and historical nature bearing on the texts, as well as passages for translation and explanation from the text-books. In Persian, French, German, Marathi, Gujarati, Kannada and Urdu, one or more questions will require to be answered in those languages. There will be an oral examination carrying 30 marks in Persian, French and German only.

In Greek, candidates will be supposed to understand the principles of iambic and hexameter verse and the chief peculiarities of Homeric dialect, grammar and syntax; in Latin, a knowledge of the metres used by Horace will be required.

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(Three Additional Papers for Honours)

Two papers will be set in additional text-books to be prescribed by the Academic Council, on the recommendation of the Board of Studies, at least three years before the examination. Candidates will be examined in the text-books prescribed. Some knowledge will be required of literature and of the philosophical or literary or historical environment of the authors of the books prescribed.

In Sanskrit, Pali, and Ardha-Magadhi the first two papers* will be on the text-books prescribed and the third paper will require a short essay or essays in English or the Honours Language (at the option of the candidate) on the history of its literature or on a subject connected with the course and unseen passages for translation from and into English.

The unseens for translation from and into English will carry 75 marks and the short essay or essays 75 marks, ample option being given in the choice of the themes for the short essay or essays.

In Persian, Arabic, French, German and Portuguese, in the papers on the text-books, candidates will be required to answer one or more questions in those languages.

In Persian and Arabic, questions requiring candidates to paraphrase passages from the prescribed text-books will be included in Honours Paper I.

The third paper in Latin, Avesta-Pahlavi and Hebrew will contain unprepared passages for translation into English and vice versa.

In the third paper in French, German and Portuguese, candidates will be required to write a short essay in the language on the history of its literature, or on a subject connected with the course, paraphrase an unseen passage and translate unseen passages from and into English. In the third paper in Persian and Arabic, candidates will be required to write a short essay in the language on the History of its literature, or on a subject connected with the course, translate unseen passages from and into English and answer questions of a general character on the literary history of the period studied (including prosody and rhetoric).

The Honours papers in Marathi, Gujarati and Urdu shall be as follows:—

Honours Paper I.—Special study of the literature of a period prescribed from time to time by the relevant Boards of Studies.

Honours Paper II.—Poetics.

Honours Paper III.—History of Literature and Literary Essay.

The Honours Papers in Kannada shall be as follows :-

Paper I.— Advanced Grammar & Philology : Grammar of-

Halagannada as explained in Shabdamanidarpana and a know-ledge of the general principles of philology with special reference to the formation and development of the Kannada language.

^{*}In view of the fact that a separate Honours paper, viz., Paper VII has been constituted for unseens, no unseen passages for translation into and from English shall be put in Pass Papers I and II.

Paper II.—Poetics: The paper will include questions in prosody and poetics as in Nagavarma's Chhandombudhi, and Karyavalokan, Kavirajamarga, Apratima Viracharita or other standard work to be prescribed.

The paper will also include questions in paraphrase and literary appreciation.

Paper III.—History of Literature and Literary Essay.—The first section will contain questions on the history of Kannada literature as in E. P. Rice, or any other work to be prescribed, and on two representative standard works (not of the same author) of a special period to be prescribed.

The second section will contain questions on essay-writing to test the knowledge of the candidates in the literary, historical, social and philosophical aspects of the set works and about 50 pages of selected inscriptions of the period prescribed.

R. 26.

(b) MATHEMATICS.*

Details of the syllabus will be specified from time to time by the Academic Council on the recommendation of the Board of Studies.

(Pass Examination)—Four Papers.

Paper. I.

Algebra and Theory of Equations-

Convergency, Binomial, Exponential Logarithmic Series, including De Moivre's Theorem, hyperbolic functions, series for $\sin \theta$ cos θ .

Partial fractions, summation of simple series.

Theory of equations, as in Smith's Algebra.

Analytical Geometry-

Of parabola, ellipes, hyperbola, including polar co-ordinates. Also reduction and tracing of curves given by the general equation of the second degree.

Paper II

Differential Calculus—

Taylor's Theorem for single variable and expansions. Partial differentiation, notation and application to two variables. Undetermined forms, maxima and minima of functions of one variable including implicit functions. Applications to plain curves with elementary theory of tangents and normals, asymptotes, singular points, curve tracing and the fundamental formula for the radius of curvature.

The last examination under the existing syllabus will be held in 1939.

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Integral Calculus—

Definitions and methods of integration, standard forms, reduction formulæ, partial fractions, standard forms of definite integrals (omitting gamma functions), integration and evaluation of areas, lengths, surfaces and volumes of revolution and centroids.

Ordinary Differential Equations—

The standard forms of the first and second orders and linear equations, with constant co-efficients.

Paper III.

Statics (Elementary)—

Including virtual work in two dimensions and application to frameworks.

Hydrostatics (Elementary)—

Paper IV.

Dynamics (Elementary)—

Astronomy (omitting astronomical instruments) treated mathematically so far as knowledge of the elementary properties of the sphere (as e. g., in Davison's Solid Geometry, Chapter IV) and a knowledge of the fundamental formulæ of Spherical Trigonometry (as e. g., in the first three chapters of Todhunter and Leathem will permit.) [In this paper no questions on the Geometry of the Sphere or Spherical Trigonometry as such are to be asked.]

N. B.—In Papers III and IV, methods of the calculus are permitted but not required.]

(Honours Examination)—Eight Papers.

Paper I.

Analytical Geometry of Conic Sections-

Including polar co-ordinates, oblique axes and general equation of the second degree.

. Solid Geometry—

Analytical Geometry of a point, line, plane, sphere, cone and central conicoids referred to their principal axes.

Paper II.

. Algebra and Theory of Equations—

The Pass Course together with determinants and multiplication of determinants of the third order. The numerical solution of equations and the theory and solution of the cubic and the biquadratic.

Trigonometry-

Trigonometry may be treated by the methods of the Calculus and will include De Moivre's Theorem, expansions of $\sin n\theta$ / sine and $\cos n\theta$ in power of $\cos \theta$, expansions and infinite product expressions for $\sin \theta$, $\cos \theta$, with partial fraction expressions obtained by differentiation. Factorization.

Papers III and IV.

Differential and Integral Calculus and Differential Equations-

Differential Calculus will extend over the Pass Course together with Taylor's Theorem for two variables, partial differentiation, farmulæ for the radius of curvature and maxima and minima for functions of two variables.

Integral Calculus—

Will extend over the Pass Course with elementary definiteintegrals (including gamma functions), double integration (excluding transformation), centroids, moments of inertia, Fourier's Series.

Ordinary Differential Equations-

Of the first and second order excluding integration by series.

Paper V.

Spherical Trigonometry—

Properties of triangles relating to sides and angles. Fundamental formulæ for a triangle including Napier's and Delambre's analogies. Solution of triangles.

Astronomy-

The earth, refraction, parallax aberration, precession and nutation, the Sun and the solar system; the Moon; eclipses; determination of latitude, longitude, first point of Aries and obliquity of the ecliptic; time; calendar. [The subject to be treated mathematically with the use of Spherical Trigonometry.]

Paper VI.

Statics (Elementary and Analytical).

Principally of two dimensions, including the principle of Virtual Work for two dimensions with application to frame works and simple-applications of funicular and force polygons.

Hydrostatics Elementary—

Equilibrium of floating bodies; metacentre for surfaces of revolution; centres of pressure treated by the methods of the Integral Calculus; rotating fluids about a vertical axis under gravity; laws of gases; hydrostatic and pneumatic machines (omitting capilarity and surface tension).

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Paper VII.

Dynamics (Elementary and Analytical)—

Rectilinear and simple harmonic motion and pendulums; parabolic motion and motion where variations of gravity are taken into account; principles of momentum, work, energy; collision of two elastic bodies; integration of motion under the law of gravitation and motion in eclipse and parabola; composition of harmonic motion and motion about a fixed axis.

Paper VIII.

Essay-

This Paper will contain not less than ten themes of sufficiently wide range and covering the main branches of study and the candidate shall write an essay on not more than two of these which will be judged on the general grasp of mathematical principles shown therein.

The first seven papers will carry 110 marks each and the eighth paper will carry 80 marks.

R. 26.

(b) Mathematics (Revised Syllabus)*

Details of the syllabus will be specified from time to time by the Academic Council on the recommendation of the Board of Studies.

Pass Examination-Four Papers.

PASS PAPER I

(Conics, Trigonometry and Theory of Equations)

(i) Analytical Conics

Change of rectangular axes. Properties of parabola, ellips and hyperbola, general equation of the second degree. Polar co-ordinates, polar equations of straight line, circle and conic in standard forms.

The scope of the syllabus is indicated by Loney's Co-ordinate Geometry: Part I, or corresponding portions from Bagi's Analytical Geometry of Conic Sections.

(ii) Trigonometry

Summation of $\Sigma \sin (a+nb)$, $\Sigma \cos (a+nb)$. General solution of $\sin x = \sin a$, etc. Properties of triangles; area of a quadrilateral. De Moivre's theorem for a rational index. Expansions in infinite series in powers of x of $\sin x$ and $\cos x$. Euler's expressions for $\sin x$, $\cos x$. Hyperbolic functions.

(iii) Theory of Equations

Relations between the roots and the coefficients. Transformation of equations. Descarte's Rule of Signs.

^{*}The first examination under the Revised Syllabus will be held in 1940.

[Part II

The scope of the syllabus is indicated by Smith's Algebra (Secs. 435-461).

PASS PAPER II

(Algebra and Calcalus)

(i) Algebra-

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Sequences. Upper and lower bounds, limits of sequences, Cauchy's Principle of Convergence (without proof), infinite series, elementary tests of convergence. Binomial, Exponential, Logarithmic series. Partial fractions. Summation of simple series. Determinants.

(ii) Differential Calculus—

Functions, limits, continuity of functions. Derivatives. Higher derivatives. Rolle's theorem. Mean value theorem. Partial differentiation. Curvature. Taylor's theorem for functions of one or two variables, and maxima and minima of functions of two independent variables.

Book recommended: Gibson—Ch. III (Secs. 25, 28, 29, 30); Chs. IV; V; VI; VII; IX; X; XI (Secs. 89-95); Ch. XVI (Secs. 140-142, 144-145); Ch. XVIII (Secs. 152-154); Ch. XIX (Secs. 157-160).

(iii) Integral Calculus—

Integration. Definite integrals. Applications to geometry, double integrals, Gamma and Beta functions. Fourier's Series (calculation of coefficients).

Book recommended: Gibson—Chs. XIII, XIV (Secs. 124-128); XV; XXII (Secs. 184, 189-192).

PASS PAPER III

(Statics and Hydrostatics)

(i) Statics-

Composition and resolution of forces in two dimensions. Moments. Couples. General conditions of equilibrium. Work. Centre of gravity. Friction. Simple machines. Principle of virtual work.

1ii) Hydrostatics-

Properties of fluids. Pressure at a point. Surfaces of equal pressure and density. Fluid thrusts on plane and curved surfaces. Centre of pressure. Equilibrium of floating bodies. Uniformly rotating liquids. Properties of gases; the atmosphere. Simple machines.

The scope of the syllabus is indicated by Lamb's Statics:

For Statics:— Introduction. Chs. I, II (Omit Secs. 16, 17), III (Omit Secs. 27, 28), VI (Omit Secs. 55-59), VII, VIII (Omit Secs. 76-79).

For Hydrostatics:—Chs. X, XI (Omit Secs. 102-110), XII, XIII. Ramsey's Hydrostatics (Camb. U. P.) may also be consulted for bookwork.

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PASS PAPER IV (Dynamics and Differential Equations)

(i) Dynamics

(a) Kinematics; Laws of motion. Conservation of momentum and energy. Units and dimensions. (b) Dynamics of a particle:—Rectilinear motion and motion in a plane, including simple harmonic motion. Trajectories under gravity. Impact of smooth elastic spheres. Central orbits under inverse square law. Moments and products of Inertia. Compound pendulum.

The scope of the syllabus is indicated by.—

Ramsey: Dynamics. Chaps. I to IV (Omit § 4.6.), V (Omit § 5.43 and § 5.44), VI (Omit §§ 6.3, 6.32), VII—XI, XII (Omit §§ .12 .71 onwards), XIII, XIV, XV (§§ 15.5, 15.51).

(ii) Differential Equations

Differential Equations of first and second orders. Linear equations with constant coefficients. Simultaneous Differential Equations.

Book recommended:

Murray's Differential Equations, Chs. I, II (§§ 7-16; 20-21); VII; VIII (§§ 76, 77, 81); XI; XII (§§ 107-109, 113-118).

Honours Examination-Eight Papers.

Paper I

(Geometry)

(i) Pure Geometry

Projection, cross-ratios, harmonic section, important properties of conics derivable by methods of conical projection.

The scope of the syllabus is indicated by Askwith's Pure Geometry: Chaps. 4, 5, 7, 9, 10.

(ii) Analytical Conics

Oblique axes; change of axes. Properties of parabola, ellipse, and hyperbola. General equation of the second degree. Confocal conics. Polar co-ordinates, polar equations of straight line, circle and conic in standard forms.

The scope of the syllabus is indicated by Loney's Coordinate Geometry: Part I, or corresponding portions from Bagi's Analytical Geometry of Conic Sections.

(iii) Solid Geometry

Planes, straight lines, change of axes (rectangular), sphere, cone, central conicoids referred to their principal axes, equation to a tangent plane to a surface, equations to a tangent line to a curve given by parametric equations.

The scope of the syllabus is indicated by Bell's Coordinate Geometry of Three Dimensions: Chaps. 1 to 7, and articles 179, 186–188 (omitting oblique axes).

Paper II.

(Algebra, Theory of Equations and Trigonometry.)

(i) Algebra and Theory of Equations

Real Numbers. Definition of an irrational number by a Dedekind section of rationals. Sequences. Upper and lower bounds, upper and lower limits, limits of sequences, Cauchy's Principle of Convergence. Infinite series, tests of convergence. Binomial, Exponential, Logarithmic series. Partial fractions. Summation of simple series. Complex numbers. Determinants. Theory of Equations.

(ii) Trigonometry.

Summation of $\Sigma \sin (a+nb)$, $\Sigma \cos (a+nb)$. General solution of $\sin x = \sin a$, etc. Properties of triangles; area of a quadrilateral. De Moivre's theorem for a rational index. Expansions of $\sin nx/\sin x$ and $\cos nx$ in powers of $\cos x$; expansions in infinite series in powers of x for $\sin x$ and $\cos x$. Infinite product formulæ for $\sin x$ and $\cos x$ (without proof). Euler's expressions for $\sin x$, $\cos x$. Hyperbolic functions.

The scope of the syllabus is indicated by Barnard and Child's Higher Algebra.—Chapters II, III (§ 18), V (§ § 1-21), VI, VII, VIII, IX (§§ 1-16, 18), XI (§§ 1-4), XII (§§ 1-5, 9, 12-14), XIII (§§ 1-3), XV, XVI, XVIII (§§ 1-4), XIX, XX, XXI (§§ 1-10), XXII (§§ 1-4), XXVIII (§§ 1-7, 11), XXX (§§ 1-5). For the remaining parts of the syllabus in Trigonometry any standard book may be consulted.

Papers III and IV.

(Elementary Analysis and applications.)

Paper III.

(i) Elementary Analysis.

Continuous real variable. Theory of limits. Continuity of functions, properties of continuous functions, uniform continuity. Derivatives and differentials. Leibniz' rule for successive differentiation of a product. Meaning of the sign of the derivative at a point and in an interval. Rolle's theorem and its applications. Cauchy's form of the Mean Value theorem and its applications to evaluation of indeterminate forms.

Functions of two or three variables, and their continuity. Simple properties of continuous functions of two variables (without proofs). Partial derivatives. Differentials and differentiable functions. Commutative property of the order of partial differentiation (Schwarz' theorem). Euler's theorem on homogeneous functions.

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Taylor's and Maclaurin's developments with remainders for functions of one, two or three variables.

Location of maxima and minima of functions of more than one variable. Use of Lagrange's multipliers in the discrimination of maxima and minima of functions of two independent variables only.

(ii) Applications to plane curves

Tangents, normal, rectilinear asymptotes (of Algebraic curves), curvature, singular points and curve tracing, p-r equation, $p-\psi$ equation, intrinsic equation, of a curve.

(iii) Associated Curves

Pedal curves, inverse curves, polar reciprocals, envelopes, evolutes, involutes.

(iv) Special well-known Curves

Cycloid, limaçon, cardioide, trisectrix, catenary, tractrix, lemniscate of Bernoulli, equiangular spiral.

PAPER IV

(i) Elementary Analysis

Integration as the operation inverse to differentiation; standard forms and methods of integration (integration by parts, by substitution, by successive reduction, by partial fractions). Riemann's definition of a definite integral. Integrability of (i) continuous functions and (ii) monotonic functions. The fundamental theorem of Integral Calculus, connecting definite integrals with primitives. The first and second Mean Value theorems of Integral Calculus. Elementary double integrals, their continuity, differentiation, integration. Inversion of order of a repeated integral, excluding the case in which both integrals have infinite limits. Notion of triple integrals.

(ii) Infinite Series

Series of variable terms. Uniform convergence; Weierstrass' M-test; properties of uniformly convergent series as regards continuity, differentiation and integration. Fundamental properties of power series. Fourier series (without proof) for functions satisfying Dirichlet's conditions.

Infinite integrals; Elementary tests for convergence. Beta and Gamma functions. Evaluation of standard infinite integrals:—

$$\int_{0}^{\infty} \frac{\sin x}{x} dx, \qquad \int_{0}^{\pi/2} \log \sin x dx, \qquad \int_{0}^{\infty} \frac{x^{n-1}}{1+x} dx, \qquad \int_{0}^{\infty} e^{-x^{2}} dx,$$
and Frullani's integrals.

(iii) Applications :-

Quadrature, approximate integration, Simpson's rule, rectification, volumes, areas of surfaces of revolution. Centres of mass; moments and products of inertia. Amsler's planimeter.

The following books are recommended:-

- 1. Gibson: Elementary Treatise on Calculus.
- 2. Lamb: Infinitesimal Calculus.
- 3. Mahajani: Lessons in Elementary Analysis.
- 4. Hardy: Pure Mathematics.
- 5. Philips: Analysis.
- 6. Gibson: Advanced Calculus.
- 7. Goursat: A course of Mathematical Analysis. Vol. 1.
- 8. Edward: Differential Calculus (for geometrical applications only.)
- 9. Gorakh Prasad: Text-book of Differential Calculus.

PAPER V

(Spherical Astronomy or Electricity and Magnetism)

Spherical Astronomy

Fundamental formulæ of spherical trigonometry and solution of spherical triangles (only as much of spherical trigonometry will be required as has a direct bearing on problems in spherical astronomy).

The Celestial Sphere and different systems of Celestial Coordinates. Atmospheric refraction. Planetary motions and phenomena. Sidereal time, mean time, conversion of time; Equation of time; Aberration; Figure of the Earth; Parallaxes of the Moon and the Sun and annual parallax of stars; Precession and Nutation. Elementary theory of Eclipses, Twilight; Sundial.

The scope of the syllabus is indicated by Smart's Spherical Astronomy:—

Chapters I, II, III, V (Omit § § 62-66, 75-79), VI, VII (Omit § § 97, 100-103), VIII (Omit § § 108, 109), IX (Omit § 124), X (Omit § § 135-143), XV (Omit § § 202-207, 215, 216).

Electricity and Magnetism

Fundamental Physical facts of electricity and magnetism.

(i) Electrostatics:-

Inverse square law, potential, Gauss's theorem, electrostatic field, lines and tubes of force, equipotential surfaces, conductors and insulators,

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induced electricity, mechanical force on a conductor, solution of simple electrostatic problems, method of images, boundary conditions, condensers, dielectric constant, condensers in series and in parallel, capacity of a parallel plate condenser and of a sphere, energy of charged bodies, distribution of energy in the electrostatic field.

Steady currents, Ohm's law, distribution of steady currents in closed circuits, Wheatstone's bridge.

(ii) Magnetism:-

Field of a magnetic doublet, magnetic induction, bar magnets, magnetic susceptibility and permeability, magnetic field due to steady electric currents, uniform magnetic shell.

The scope of the syllabus is indicated by Ramsey's Electricity and Magnetism (C. U. P.) [Omit Chapter IV; Ch. VI §§ 6.5, 6.51; Ch. VII §§ 7.7, 7.71].

Paper VI

(Statics and Hydrostatics)

(i) Statics-

Composition and resolution of forces in two and three dimensions. Moments. Couples. General conditions of equilibrium. Work. Centre of gravity. Stability of equilibrium. Simple machines. Principle of virtual work. Equilibrium of strings.

(ii) Hydrostatics—

Properties of fluids. Pressure at a point. Differential equation of fluid pressure under any system of forces. Surfaces of equal pressure and density. Fluid thrusts on plane and curved surfaces. Centre of pressure. Equilibrium of floating bodies. Discussion of stability in simple cases. Uniformly rotating liquids. Properties of gases; the atmosphere. Specific gravity. Simple machines.

The scope of the syllabus is indicated by Lamb's Statics:

For Statics:— Introduction, Chs. I, II (Omit §§ 16, 17), III (Omit §§ 27, 28), VI (Omit §§ 55, 56), VII, VIII (Omit §§ 76-79), IX.

For Hydrostatics:—Chs. X, XI (Omit §§ 108, 109), XII, XIII. Ramsey's Hydrostatics (Camb. U. P.) may also be consulted for bookwork.

Paper VII

(Dynamics and Differential Equations)

(i) Dynamics-

(a) Kinematics; Laws of motion. Conservation of momentum and energy. Units and dimensions. (b) Dynamics of a particle:—Rectilinear

motion and motion in a plane, including simple harmonic motion. Trajectories under gravity. Impact of smooth elastic spheres. Central orbits. (c) Elementary Dynamics of Rigid Bodies:—Moments and products of Inertia. Equations of Motion, with simple two dimensional problems, particularly those illustrating Principles of Energy and Momentum.

The scope of the syllabus is indicated by—

Ramsey: Dynamics. Chaps. I to IV (Omit § 4.6), V (Omit § 5.43 and § 5.44), and VI-XV (Omit § § 6.3, 6.32).

(ii) Differential Equations

Formation of a differential equation. Methods of solving equations of the first order and first degree. Separable variables, homogeneous equations, integrating factors, linear equations and equations reducible to the linear type, exact equations. Simple equations of first order. Singular solutions. Linear equations with constant coefficients. Homogeneous linear Equations of any order. Linear Equations of Second order. Trajectories.

The scope of the syllabus is indicated by Murray's Differential Equations: Chapters I, II (Omit § § 17-19), III, IV, V, VI, VII, VIII, (Omit § § 73-75, 82, 83) and IX.

Paper VIII

Essay—This paper will contain not less than ten themes of sufficiently wide range and covering the main branches of study, and the candidate shall write an essay or essays on not more than two of these which will be judged on the general grasp of mathematical principles shown therein.

The first seven papers will carry 110 marks each and the eighth paper will carry 80 marks.

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(c) HISTORY AND ECONOMICS.

(Pass Examination) Four Papers

- 1. History of England ... (Political and Constitutional).
- *2. One of the following periods in the History of India:-
 - I. Ancient India ... (From the earliest period upto the death of Harshavardhana.)
 - II. Mediaeval India ... (From the invasion of Mahomed Ghazni to the death of Aurangzeb.)
 - III. Modern India ... (1707 to 1914.)
 - 3. Politics.
- 4. Economics.

[N. B.—The general principles of Economics are wherever possible, to be studied in reference to Indian conditions and problems.]

*The first examination under the revised syllabus in the periods in Indian History will be held in the first half of the year 1939.

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SCOPE, METHODS, FUNDAMENTAL CONCEPTS.

Definition, scope and methods. Relations to other sciences, especially Psychology and Ethics.

Fundamental concepts; utility, value, wealth.

Meaning and stages of economic development. Conditions of economic life. Private property, competition, freedom.

Value. Marginal utility. Marginal cost. Capital value and rental value. Determination of market value and normal value. Law of increasing, constant and diminishing return.

PRODUCTION.

Factors of production. Nature and man. Land and labour. Co-operation and division. Population. Factors determining quantity and quality. Large scale production. Pools. Cartels. Trusts.

Capital. Organization in agriculture, industry, finance.

DISTRIBUTION OF WEALTH.

National dividend and its distribution. Rent. Land tenure. Justification of rent. Interest. Profits. Ordinary and speculative profits. Justification of profits. Wages. Theories of Wages. The Labour problem. Labour legislation. Labour Organisation. Profitsharing. Co-operation. Socialism.

EXCHANGE.

Money and coinage. Value of money. Index numbers. Quantity theory. Level of prices. Systems of currency. Paper money. Credit, forms and function, banks and banking. Theory of International Trade. Foreign Exchanges.

CONSUMPTION.

The consumer's freedom and the distribution of wealth. Socialisation of consumption. The marginal utility theory. Organization of values and standards of living.

PUBLIC FINANCE.

Revenue and expenditure. Principles of taxation. Public debt. Loans and taxation.

Three additional Papers for Honours.

The Honours Degree may be taken in either (i) History or (ii) Economics.

(i) History.

- 1. European History.
- 2. Greek or Ancient Persian History or Roman History.
- *3. Essay.

OR

^{*} The paper will contain not less than six themes and the candidates shall be required to write essays on not more than two of them.

(ii) Economics.

- 1. History of Economic Doctrines and a period of English Economic History.
- 2. Indian Economics.
- *3. Essay.

INDIAN ECONOMICS.

- 1. Indian Economics, a separate subject for study.
- 2. Survey of India's physical environment and natural resources. Improvements by human efforts.
- 3. Population: Statistics. Population and Wealth. Distribution, according to vocation, sex, age. Distribution between city and country. Movements of population. Birth rate. Death rate. High mortality, its causes and remedies. Migration of population. Birth control. Eugenics.
- 4. Social and religious institutions: Their economic significance. The caste system. The joint Family. Laws of Property Succession and Inheritance. Religious and Psychological factors. Their bearing on economic life.
- 5. Economic transition in India during the last hundred years: Ruralization. Decay of indigenous industries. Loss of economic equilibrium. Sudden transition from local to international economy.
- 6. Agriculture: Statistics of production and exports of agricultural products. Yield per acre. Low productivity. Lack of capital. Problem of manure. Sub-division and fragmentation of holdings. Causes and remedies. Live stock. Agricultural indebtedness. Causes, extent and remedies. Co-operation. Land Mortgage Banks. Agricultural labour. Organization and marketing. Land tenures.
- 7. Industries: History and Survey. Statistics of production-Large scale industries. Organization and enterprise. Indigenous and foreign capital. Marketing. Importance of Cottage industries. Financing and Marketing. Fiscal policy. Protection. State aid to industries.
 - 8. National dividend of India and its distribution.
- 9. Labour: Statistics. Low efficiency, its causes and remedies-Trade Unionism. Labour Legislation.
- 10. Transport: Roads, Railways. Railway Finance and Policy. Canals. Mercantile marine.
- 11. Foreign trade: Statistics of exports and imports. Balance of trade and balance of accounts. Home charges, Foreign trade and national welfare.
- 12. Indian currency system: History. Gold Standard, and Gold Exchange Standard. Council Bills. Reverse Bills. Gold Standard Reserve. Paper Currency. Foreign Exchanges.

^{*}The paper will contain not less than six themes and the candidates shall be required to write essays on not more than two of them.

B. A. : EXAMINATION

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- 13. Indian Banking: Imperial Bank of India, Exchange Banks. Joint Stock Banks. Mahajans. Post Office Savings Banks. Cooperative Banks. Seasonal stringency and Bank rate. Industrial Banking.
- 14. Indian Finance: Central, Provincial, Local. Allocation of sources of revenue between the Central and Provincial Governments. Revenue. Expenditure. Public debt. Taxable capacity of the people.

R. 28.

(d) MENTAL AND MORAL PHILOSOPHY.

(Pass Examination)—Four Papers.

Paper I.—Elements of Ethics.

Paper II.—Elements of Psychology.

Paper III.—History of Ancient Philosophy from Socrates to Aristole (inclusive) and History of Modern Philosophy from Descartes to Kant (inclusive).

Paper IV.—Philosophical Essay. (The paper shall contain at least four questions and not more than two shall be attempted).

Three Additional Papers for Honours

Paper V.—Elements of Metaphysics.

Paper VI.—Contemporary Philosophy.

Questions shall be strictly limited to "Perry's Present Philosophical Tendencies," and to the following Philosophers dealt with in Hoffding's "Modern Philosophers and Lectures on Bergson," pp. 56—70 (Bradley) and 158—302 (Nietzsche, Eucken James and Bergson).

Either

Paper VII.—History of Indian Philosophy.

Questions shall be restricted to the elements of the six systems of Indian Philosophy—Purva and Uttar Mimamsa, Samkhya and Yoga, Nyaya and Vaiseshika. An understanding of the broad and characteristic views and doctrines of these six systems with their inter-relations is expected.

02

One of the following Special Philosophers to be determined by the Academic Council, on the recommendation of the Board of Studies, at least two years before the examination:—

(a) Plato: The Republic (for 1936 and 1937).

(b) Spinoza: Ethics (for 1938 and 1939).

(c) Bradley: Appearance and Reality (1940 and 1941).

(d) Bergson: Creative Evolution (1942 and 1943).

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(e) PHYSICS AND CHEMISTRY.

(i) Physics.

(Two Papers and two Practical Examinations of not more than three hours each.)

Candidates shall be examined in the following branches of the subject in accordance with details which shall be specified by the-

Academic Council, on the recommendation of the Board of Studies, from time to time.

Course Prescribed.

General Physics: Mechanics (Kinematics, Kinetics, Statics), Hydrostatics, Properties of matter.

Heat: Temperature, Thermometry, Calorimetry, Transference of heat, First and Second Laws of Thermodynamics.

Sound.

Light: Geometrical and Physical Optics.

Electricity and Magnetism, including elementary Dynamo and Motor Machinery.

Pass candidates will be examined in the syllabus as detailed below, with the exception of the portion marked with an asterisk, and the Honours candidates will be examined in the whole syllabus.

The papers will be constituted thus:-

Paper I.—Mechanics, Hydrostatics, Properties of Matter, Sound and Heat.

Paper II.—Light, Electricity and Magnetism.

DETAILS:

General Physics.

Units and dimensions. Length and instruments of measurement. Matter, mass and instruments of measurement. Sensitiveness of a balance. Faults in a balance. Volumes and densities of solids, liquids and gases. Work, energy, forms of energy, conservation of energy. Circular motion, conical pendulum. Moment of inertia. Energy of rotation. Simple pendulum. Compound pendulum. Kater's reversible pendulum. Elastic oscillations. Combination of two S. H. M's. Elasticity, Poison's ratio. Bulk-modulus. Modulus of rigidity and experimental determination of the same. Torsion and torsinal balance and pendulum. Joly's spring balance. Impact. Bending of rectangular rods. Experimental determination of Young's Modulus. *Searles method for the determination of Young's Modulus and rigidity. Gravity, measurements of gravity. Atwood's machine. Falling plate. Pendulum. Reversible pendulums. Errors in determination of "g". Kepler's laws and Newtons' laws. Motion of the Moon. Universal law of gravitation. Variation in 'g' due to the altitude. Shape of the Earth. Gravitation constant. Cavendish's methods. Boy's method.

Gas laws. Kinetic theory of gases. Avogadro's hypothesis. Vonder Waal's equation. *Molecular free path. Effusion, transpiration, diffusion. Solution of gases in liquids. Henry's law. Passage of gases through solids. Siphon barometer. Fortin's barometer. Corrections to a barometer reading. Pressure gauges. *Relation between pressure and height.

Hydrostatics.—Thrust and pressure in liquids. Conditions of equilibrium of a floating body. Metacentre, centre of pressure. Siphon. Velocity of efflux. Vena contracta. Molecular structure of a liquid. Viscosity of liquids. *Fick's law. Osmosis, dialysis.

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Osmotic, pressure and vapour pressures of solutions. Friction. Ropebrake. Capillarity (small quantities of liquids). Surface tension. Three separating surfaces. Angle of contact. Measurement of angle of contact. Rise of liquid. Evaporation at curved surfaces.

Sound.

Interference of waves. Huyghen's construction for reflections of waves. Stationary waves. Transverse waves on a string. *Deepwater and shallow-water waves. Compression and dilatation waves. Velocity of sound in homogeneous solids, corrections. Temperament. Musical scales. Interference. Stationary waves in free air. Doppler's principle. Vibrations of strings, rods, plates and columns of gas. Energy of vibration. Damping. *Forced and free vibrations.

Heat.

All work set for Inter. Science in greater detail, together with :- Compensation of timekeepers. The gas thermometer. Specific heat, *radiation correction, Specific heat of a gas. Specific heat of a gas at constant pressure. Specific heat of a gas at constant volume. Variation of specific heat with change of temperature, density and state. Dulong and Petit's law. Effect of pressure on the melting point. Bunsen's ice calorimeter. Joly's steam calorimeter. Vapour density. Measurement of vapour pressure. Effect of curvature of the surface on the vapour pressure. Sublimation. The triple point. Freezing point of solutions. Heat of solution, freezing mixtures. Boiling point of solutions. Thermal phenomena accompanying chemical change. Curves showing relations between pressure, volume and temperature. Isobars. Isothermals. The critical point. Density of staturated vapour and of the liquid up to the critical point. Vandar Waal's equation. Liquefaction of gases. Conductivity. Lee's method. Conductivity of liquids. Conductivity of gases. Equality of emissive and absorptive powers. Measurement of coefficient of absorption and emission. Relation between amount of radiation and temperature. Stefan's law. Specific heat by cooling. Mechanical theory of heat. Work done in expanding a gas. *Ratio and difference of specific heat in term of J. *Work done in a change of state. *Changes in kinetic energy of molecules when heated. Adiabatic expansions. Clement and Desorme's experiment. Carnot's theorem. Second law of thermo-dynamics.

Light.

Reflection of a spherical wave at a plane surface. Rotation of a plane mirror. Reflection at two plane mirrors. Caustics formed by reflection. Parabolic mirrors. Position of the image formed by two lenses. Eye-pieces. Velocity of light, Fizeau's method, Foucalt's method. Aberration. Nature of light. Refractive index, dispersive power. Achromatic prisms. Achromatic lenses. *The rainbow. Interference of light. The diffraction grating. Colours of thin plates. *Newton's ring. *Rectilinear propagation of light. *Diffraction. Nature of light emitted by a luminous body. Spectra. Series spectra. Absorption of light. Reversal of lines. Displacement of spectral lines. Anomalous dispersion. Colour produced by

absorption. Chemical action of absorption. Polarisation. Double refraction. Interference of polarised light. Wave surfaces in uniaxial crystals. Huyghen's construction. Nicol's prism. Polarisation by reflection. Brewster's law. Rotation of the plane of polarisation. Saccharimeters, chemical activity.

Electricity and Magnetism.

Magnetism.—Gauss's proof of the law of inverse squares. Magnetic potential. Potential at any point due to a short magnet. Surfaces of equal magnetic potential. Relationship between magnetic intensity and potential. Molecular magnets. Behaviour of soft iron in magnetic fields. Magnetic screening. Magnetic keepers. Distribution of free magnetism along a bar magnet. Distinction between lines of force, lines of magnetisation and lines of induction. Paramagnetic and diamagnetic substances. Moments of magnets. *Determination of H at observatories.

Statical Electricity.—The electric field. Capacity of a sphere. Field of force of a simple air condenser. Capacity of a simple air condenser. The capacity of a spherical condenser. Successive condensers. Comparison of capacities by electrostatic methods. Faraday's experiments on dielectrics. Residual charge. Relation between intensity of field and specific inductive capacity. The force of attraction between the plates of a condenser separated by a dielectric. Parallel plate condenser with compound dielectric. Leyden jars in parallel and in series. The energy of a charged condenser. Loss of energy when a charged and an uncharged condenser are connected. Condensers of large capacity. *Attracted disc electrometer. The Dolezalek electrometer. *The electrostatic voltameter.

Dynamical Electricity.—Voltaic cell. Field due to a linear current. Field due to a current in a circular conductor. Equivalent magnetic shell. Ampere's theorem. Magnetic moment of a circular current. Magnetic field due to a solenoid. Mechanical force acting on a linear conductor conveying a current when placed in a magnetic field. Measurement of an intense magnetic field. Force exerted by a magnetic field on a rectangle conveying a current. Mutual action of parallel and oblique currents. Suspended coil galvanometers. Ballistic galvanometer (suspended magnet type). Resistance. Kirchhoff's laws. Temperature co-efficient of resistance. Platinum resistance thermometers. Grouping of cells. The potentiometer. *Thermo-electricity. Magnetisation of iron. Permeability and susceptibility. Measurement of permeability by magnetometer method and by ballistic method. Curves of magnetisation. *Hysteresis. Magnetic induction. General principles. Foucault currents. Self-induction. Mutual induction. The Ruhmkorff induction coil. Instantaneous value of the induced E. M. F. in an earth inductor. Alternating currents. Induced currents produced by rotating a coil in a magnetic field. Machines for the conversion of mechanical energy into electricity. Dynamo electric machines. Series, shunt, and compound machines. Back E. M. F. in motors. Chemical effects of the electric current. Discharge of electricity through gases. *Units and dimensions.

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Practical Examinations.*

Pass candidates will be examined in the following course of Practical Physics together with experiments: marked "*" in the practical course for Honours candidates.

Practical Work.

Every candidate shall complete a course of laboratory work of not less than 25 experiments as detailed by the Academic Council on the recommendation of the Board of Studies. Each candidate shall produce a certificate from the Head of the Department that he has completed in a satisfactory manner at least the prescribed number of experiments. Every candidate must record his observations directly in his laboratory journal and write therein a report on each exercise performed. Every journal is to be signed periodically by a member of the laboratory staff and certified at the end of the year. Candidates must be examined in any of the experiments marked "*" or on any other experiments performed by him in the laboratory as shown in the journal. The journal shall be produced at the examination.

Practical Course.

Experiments marked " * " are to be considered 'compulsory.'

- *1. Use of the balance. Method of oscillations.
- *2. Use of callipers.
- *3. Use of micrometer screw.
- *4. Use of spherometer.
- *5. Specific gravity. Specific gravity bottle.
 - 6. Inclined plane.
- 7. Co-efficient of friction.
- 8. Force ratio of a pair of pulley blocks.
- *9. Y by stretching.
- 10. Atwood's machine.
- *11. 'g' by pendulum.
 - 12. Verification of Boyle's law.
 - 13. Surface tension.
- *14. μ'' by pin method.
- *15. Radius of curvature of a concave mirror.
- *16. Radius of curvature of a convex mirror.
- *17. Focal length of a convex lens.
- 18. Focal length of a concave lens.
- 19. Photometers. Rumford, Bunsen, Joly.
- *20. Testing a thermometer.
- 21. Boiling point of a liquid.
- 22. Co-efficient of linear expansion of a solid.
- *23. Specific heat of a solid.

^{*}The Practical Examination under the existing syllabus will be held for the .last time in 1939.

EXAMINATIONS

- 24. Latent heat of fusion.
- *25. Latent heat of vaporisation.
- *26. Frequency of a tuning fork (string method).
- *27. Velocity of sound (resonance).
 - 28. Hygrometers.
 - 29. Magnetic moment of a bar magnet.
- 30. Magnetic axis and meridian.
- *31. Tangent galvanometer.
- 32. Resistance by substitution.
- *33. Resistance by meter bridge.

Practical Courses for Honours candidates.

[B. A. Pass Physics students need do only those marked "*" in addition to I. Sc. work.]

Experiments marked "*" are to be considered 'compulsory.'

- *1. Sensitiveness of a balance.
 - 2. Use of a travelling microscope.
 - 3. Y by bending.
- *4. Modulus of rigidity, statical method, dynamical.
 - 5. Moment of inertia of a fly wheel.
- 6. Moment of inertia of a disc.
- *7. Moment of inertia of a bar bifilar suspension.
- *8. Kater's Pendulum.
- 9. Frequency of a tuning fork.
- *10. Velocity of sound (Kundt's tube).
- *11. Sonometer.
- *12. Angle of rotation of a plane mirror.
 - 13. Use of a sextant.
 - 14. Determination of critical angle.
 - 15. μ by rising of image.
- 16. Focal length of a lens by use of a telescope.
- 17. μ of a liquid by lens and mirror.
- *18. Focal length of a concave lens by using a convex lens.
- 19. Radii of curvature of a lens.
- *20. Magnifying power of a miscroscope.
- 21. Magnifying power of a telescope.
- *22. μ by spectrometer.
- 23. Calibration of a spectroscope.
- 24. Calibration of the bore of a thermometer.
- 25. Cubical expansion of water, specific gravity bottle.
- 26. Constant volume of air thermometer.

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- *27. Specific heat of a solid with corrections for radiation.
 - 28. Melting point by cooling curve.
 - 29. Specific heat of a liquid by method of cooling.
- 30. Mechanical equivalent of heat (Electrical method).
- *31. Comparison of magnetic movements.
- *32. Determination of H.
- 33. Determination of the Dip.
- 34. Resistance of a galvanometer—
 - (1) by shunting,
 - (2) by Kelvin's method,
 - (3) with P. O. B.
- 35. Internal resistance of a cell.
- 36. Resistance of an electrolyte. Kohlrausch's method.
- 37. Change of resistance with temperature.
- *38. Resistance of a wire by P. O. B.
- 39. Comparison of two low resistances.
- 40. Measurement of a high resistance.
- *41. Constant of galvanometer. Water voltameter. Copper voltameter.
- 42. Comparison of capacities. Bridge method.
- *43. Comparison of E. M. F. using Potentiometer.
- 44. Biprism, wave length.
- 45. Newton's rings.
- 46. Diffraction grating.
- 47. Saccharimeter.

Practical Examinations. (Revised Syllabus).*

Pass candidates will be examined in the following course of Practical Physics:—

Practical Work.

Every candidate shall complete a course of laboratory work of not less than 25 experiments as detailed by the Academic Council on the recommendation of the Board of Studies. Each candidate shall produce a certificate from the Head of the Department that he has completed in a satisfactory manner at least the prescribed number of experiments. Every candidate must record his observations directly in his laboratory journal and write therein a report on each exercise performed. Every journal is to be signed periodically by a member of the laboratory staff and certified at the end of the year. Candidates may be examined on any of the experiments shown below or on any

^{*}The Practical Examination according to the revised syllabus will be held for the $\it first$ time in March 1940.

others of a similar type done by them in the laboratory as shown in the journal. The journal shall be produced at the examination.

Practical Course.

- 1. Use of the balance. Method of oscillations.
- 2. Sensitiveness of a balance.
- 3. Use of callipers.
- 4. Use of micrometer screw.
- 5. Use of spherometer.
- 6. Specific gravity. Specific gravity bottle.
- 7. Inclined plane.
- 8. Co-efficient of friction.
- 9. Force ratio of a pair of pulley blocks.
- 10. Y by stretching.
- 11. Modulus of rigidity, statical method, dynamical.
- 12. Moment of inertia of a bar (bifilar suspension).
- 13. Atwood's Machine.
- 14. 'g' by pendulum.
- 15. Kater's Pendulum.
- 16. Verification of Boyle's Law.
- 17. Surface tension.
- 18. Frequency of a tuning fork (string method).
- 19. Velocity of sound (resonance).
- 20. Velocity of sound (Kundt's tube).
- 21. Sonometer.
- 22. Angle of rotation of a plane mirror.
- 23. μ'' by pin method.
- 24. Radius of curvature of a concave mirror.
- 25. Radius of curvature of a convex mirror.
- 26. Focal length of a convex lens.
- 27. Focal length of a concave lens.
- 28. Focal length of a concave lens by using a convex lens.
- 29. Magnifying power of a microscope.
- 30. μ by spectrometer.
- 31. Photometers. Rumford, Bunsen, Joly.
- 32. Testing a thermometer.
- 33. Boiling point of a liquid.
- 34. Co-efficient of linear expansion of a solid.
- 35. Specific heat of a solid.
- 36. Specific heat of a solid with corrections for radiation.
- 37. Latent heat of fusion.

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- 38. Latent heat of vaporisation.
- 39. Hygrometers.
- 40. Magnetic moment of a bar magnet.
- 41. Magnetic axis and meridian.
- 42. Comparison of magnetic moments.
- 43. Determination of H.
- 44. Tangent galvanometer.
- 45. Resistance by substitution.
- 46. Resistance by meter bridge.
- 47. Resistance of a wire by P. O. B.
- 48. Constant of galvanometer. Water voltameter. Copper voltameter.
- 49. Comparison of E. M. F. using Potentiometer.

Practical Courses for Honours candidates.

Candidates may be given experiments from the B. A. Pass course and the following:—

- 1. Use of a travelling microscope.
- 2. Y by bending.
- 3. Moment of inertia of a fly wheel.
- 4. Moment of inertia of a disc.
- 5. Frequency of a tuning fork.
- 6. Use of a sextant.
- 7. Determination of critical angle.
- 8. μ by rising of image.
- 9. μ of a liquid by lens and mirror.
- 10. Focal length of a concave lens by using a convex lens.
- 11. Radii of curvature of a lens.
- 12. Magnifying power of a telescope.
- 13. Calibration of a spectroscope.
- 14. Calibration of the bore of a thermometer.
- 15. Cubical expansion of water, specific gravity bottle.
- 16. Constant volume of air thermometer.
- 17. Melting point by cooling curve.
- 18. Specific heat of a liquid by method of cooling.
- 19. Mechanical equivalent of heat (Electrical method).
- 20. Determination of the Dip.
- 21. Resistance of a galvanometer—
 - (1) by shunting,
 - (2) by Kelvin's method,
 - (3) with P.O.B.

- 22. Internal resistance of a cell.
- 23. Resistance of an electrolyte. Kohlrausch's method.
- 24. Change of resistance with temperature.
- 25. Comparison of two low resistances.
- 26. Measurement of a high resistance.
- 27. Comparison of capacities. Bridge method.
- 28. Biprism, wave length.
- 29. Newton's rings.
- 30. Diffraction grating.
- 31. Saccharimeter.

(ii) Chemistry.

Pass Examination

(Two Papers and two Practical Examinations.)

The subjects as for the Honours Examination treated in a more simple manner.

Practical Examination.

Each candidate must produce a certificate from the Head of the Chemistry Department of his College that he has completed, in a satisfactory manner, a practical course on the lines laid down from time to time by the Academic Council on the recommendation of the Board of Studies and that his laboratory journal has been properly kept. Every candidate must have recorded his observations directly in his laboratory journal, and written therein a report on each exercise performed. Every journal is to be signed periodically by a member of the laboratory staff. Candidates are to produce their laboratory journals at the practical examination.

COURSE OF PRACTICAL WORK AT PRESENT PRESCRIBED.

- 1. Exercises in qualitative separation, mixtures not to contain more than one inorganic acid and two inorganic bases.
 - 2. Preparation and purification of inorganic salts.
- 3. Preparation and purification of the simpler organic compounds, involving exercises in bromination, esterification, nitration and simple condensations.
 - 4. Determination of melting point, boiling point, solubility.
- 5. The gravimetric and volumetric determination of the following metals and acids as occurring in simple substances not containing more than one metal and one acid:—Silver, Lead, Copper, Iron, Aluminium, Calcium; Chlorides, Sulphates, Phosphates, Carbonates.

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Honours Examination (Revised Syllabus).

(Two Papers and two days' Practical Examination.)

Details of the Syllabus will be specified from time to time by the Academic Council on the recommendation of the Board of Studies.

Theoretical Examination

Inorganic Chemistry:

The subject as for Intermediate Science Examination treated more fully and in greater details, including the consideration of the following elements and their principal compounds not then studied:

Helium, Neon, Argon, Gold, Strontium, Radium, Cadmium, Selenium, Tellurium, Uranium, Nickel, Cobalt and Platinum.

Manufacturing methods with special reference to the manufacture of: Helium, Hydrogen, Chlorine, Oxygen, Sulphuric Acid, Nitric Acid, and Alkalies.

Metallurgical methods illustrated by the manufacture of: Iron, Copper, Silver, Lead, Aluminium, Nickel, Chromium, Platinum and Gold. The discussions of the physico-chemical principles involved in the manufacture of these may be omitted.

A study of the periodic classification of the elements as illustrated by the elements and their compounds studied.

Organic Chemistry:

Purification of Organic substances. The detection of Carbon, Hydrogen, the Halogens, Nitrogen, and Sulphur. Ultimate analysis. Empirical and molecular formulæ.

The principles of Organic Chemistry, illustrated by the following types of reaction and by the following substances and classes of substances:—

Types of Reactions:

Halogenation, Nitration, Sulphonation, Oxidation, Reduction. Condensation. Fermentation. Esterification, Hydrolysis, Diazotisation. The Grignard reaction, Aceto-acetic, ester synthesis, Malonic ester synthesis.

Substances and Classes of Substances:

Open chain saturated and unsaturated hydrocarbons and their Halogen derivatives. Alcohols, including Alkye alcohol, Glycol, and Glycerine. Ethers. Thio-alcohols and Thio-ethers. Aldehydes. Ketones. Fatty acids and their halogen substitution products. Soaps, acid chlorides, bromides. Ketonic acids. Dibasic acids. Hydroxyacids.

Amines, Alkyl derivatives of phosphorus and arsenic Acid amides, Nitroparaffins, Sulphites and Sulphonic acids. Cyanogen compounds.

Carbohydrates including glucose, fructose, galactose, cane sugar, lactose, maltose, starch and cellulose.

^{*}The first examination under the Revised Syllabus will be held in April 1939.

Aromatic hydrocarbons; their halogen derivatives, sulphonic acids, nitrosubstitution products, and amino derivatives, Diazo compounds and azo colours. Phenylhydrazine. Phenols. The simpler aromatic alcohols and their derivatives. Aromatic ketones and aldehydes. Aromatic acids including benzoic, toluic, pthalic, salicylic, and cinnamic acids. Quinones. Phenolphthalein. Triphenylmethane colours.

Naphthalene and its principal derivatives: anthracene, anthra-quinone, alizarine.

Heterocyclic ring compounds, including furfurane, pyrrolthiopene, pyridine, quinoline, iso-quinoline and their chief derivatives.

Uric acid, Caffeine and Theobromine.

Physical Chemistry:

Atomic and molecular theories. Atomic numbers. Principles involved in the determination of molecular and atomic weights. Elementary knowledge of the electronic conception of valency.

Kinetic molecular hypothesis. Deviation in the behaviour of gases. Van der Waal's equation. Liquefaction of gases and critical phenomena.

Parachors. Dielectric constant. Absorption and emission spectra. Osmotic pressure. Molecular weights of substances in solution. Thermochemistry. Influence of temperature and pressure on chemical equilibrium. Law of mass action and its application. Kinetics of chemical reaction. Solution of liquids in liquids. Distillation of mixtures of miscible and non-miscible liquids. The phase rule and its applications to simple systems of one and two components.

Faraday's laws of electrolysis. Theory of electrolytic dissociation-Molecular conductivity. Transport numbers. Ostwald's dilution lawstrength of acids and bases. Hydrolysis. Solubility product.

Colloidal solutions, their properties and preparation. Adsorption.

Practical Examination.

Each candidate must produce a certificate from the Head of the Chemistry Department of his College that he has completed in a satisfactory manner a practical course on the lines laid down from time to time by the Academic Council, on the recommendation of the Board of Studies, and that his laboratory journal has been properly kept. Every candidate must have recorded his observations directly in his laboratory journal and written therein a report on each exercise performed. Every journal is to be signed periodically by a member of the laboratory staff. Candidates are to produce their laboratory journals at the practical examination.

Practical Work.

Inorganic Chemistry:

(1) Qualitative analysis of mixtures containing not more than two inorganic acids and two inorganic bases from among the following, in addition to those prescribed for the Intermediate Science Examination:

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Strontium, Cadmium, Nickel, Cobalt; Borate, Chlorate. Sulphite and Nitrite.

- (2) Preparation and purification of inorganic compounds such as:
 - Barium peroxide, Hydrogen peroxide, Lead peroxide. (ii) Cuprous chloride, Magnesium chloride (anhydrous). (iii)
 - Cupric ammonium sulphate, Cupric ammonium chloride. (iv) Sodium nitrate, Sodium thiosulphate, Potassium nitrate from sodium nitrate and potassium chloride, Potassium perchlorate, Iodine pentoxide.

Potassium bichromate from chrome iron ore, Potassium permanganate from Manganese dioxide.

Hydrazine sulphate, Hydroxylamine sulphate. (vi)

The candidate should have prepared and purified at least one substance from each of the above sub-heads.

(3)Estimation of:

> K, Ca, Ba, Zn, Al, Fe, Ag, Pb, Cu, Ni, Sulphate, Chloride, Carbonate, Nitrate and Phosphate.

Organic Chemistry:

- Preparation and purification of the organic compounds mentioned below. Each candidate shall prepare at least one compound from each sub-head:
 - Chlorobenzene, Bromobenzene, Tribromophenol, Parabromoacetanilide.
 - Nitrobenzene, Meta-dinitrobenzene, Ortho-nitrophenol (ii)and Para-nitrophenol.
 - Ethyl acetate, Ethyl iodide, Ethyl benzoate. (iii) (iv) (v) (vi) Sulphanilic acid, Naphthalene-sulphonic acid.

Iodoform.

Oxalic acid from sugar. (vii) Benzoin, Acetanilide.

(viii) An azo- colour from aniline.

Detection of the following organic compounds given as (2)single substances:

Chloroform, Ethyl alcohol, Acetic acid. Oxalic acid. Succinic acid.

Citric acid, Tartaric acid and Glucose.

Benzaldehyde, Benzoic acid, Phenol, Salicylic acid, Nitrobenzene.

Aniline, Acetanilide and B-Naphthol.

Physical Chemistry:

Determination of the vapour density of volatile substances (1)by Victor Meyers method.

Surface tension and viscosity of liquids.

Partition coefficient. Heat of neutralisation.

Heat of solution.

Velocity of monomolecular reactions.

Preparation and coagulation of colloidal solutions.

The candidate shall perform at least one experiment of each type.

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(f) BOTANY AND ZOOLOGY.

(i) Botany.*

Pass Examination

(Two Papers and two Practical Examinations.)

(Each of 75 Marks.)

I.—External Morphology.—The detailed morphology of the root, shoot and reproductive organs (including fruit and seed) in both Pteridophytes and Spermatophytes.

II.—Internal Morphology.—The structure of the cell; Karyo-kinetic and other methods of division; tissues, primary and secondary meristems, parenchyma, prosenchyma, vascular or conducting tissues, tracheal and sieve tube, laticiferous and glandular tissue; tissue system, epidermal ground tissue, and vascular or conducting: the internal structure of plant organs.

III.—Physiology.—Nutrition, the food of plants and its absorption, osmosis, root pressure, photosynthesis, translocation and storage of food, transpiration and exudation, the nutrition of parasites, saprophytes and insectivorous plants, growth, conditions influencing growth, growing regions in plant. Metabolism, the cycle of plant energy, respiration, enzymes, and the digestion of reserve food. Response to stimuli as evinced in the structure and movement of plants. Sexual and asexual reproduction.

IV.—*Ecology*.—The reaction of plants to their environment as illustrated by aquatic plants, hygrophytes, mesophytes and xerophytes; floral mechanisms and seed dispersal.

V.—Evolution.—Theories of evolution; Genetics including the work of mendel.

VI.—Plants.

1. The plant body, its parts, their forms and arrangement.

2. The internal structure of plants.

3. The functions of plant parts and tissues.4. The principal divisions of the plant kingdom.

The above points are to be studied in an elementary manner from common plants and in addition the following types are to receive special attention—

Bacillus, Yeast, Mucor, Spirogyra, Nephrolepis, Cycas, Maize, Bean, Nymphæa.

Practical Examination.

Every candidate shall complete a laboratory course in accordance with the Regulations issued from time to time by the Academic Council, on the recommendation of the Board of Studies. Each candidate shall

The last examination under the existing syllabus will be held in 1939. The Firs texamination under the Revised Course (vide page 186) will be held in March 1940.

produce a certificate from the Principal of his College that he has completed in a satisfactory manner the prescribed course. Every candidate must record his observations directly in his laboratory journal. Every journal is to be signed periodically by a member of the laboratory staff and certified by him at the end of the year. Candidates are to produce their journals at the practical examination and such journals may be taken into account by the Examiners in assigning marks.

Practical work-

- (1) The recognition, dissection, examination, and description, of the above-mentioned plants and parts of them.
- (2) The use of the microscope in examining the structure of plants. The preparation of the above-mentioned plants and parts of them for the microscope.

Honours Examination.

(Two Papers and two Practical Examinations.)
(Each of 75 Marks.)

- I.—External Morphology.—The detailed morphology of the root, shoot and reproductive organs (including fruit and seed) in both Pteridophytes and Spermatophytes.
- II.—Internal Morphology—The structure of the cell; Karyo-kinetic and other methods of division; tissues primary and secondary, meristems, parenchyma, prosenchyma, vascular or conducting tissue, tracheal and sieve tube, laticiferous and glandular tissue; tissue systems, epidermal ground tissue, and vascular or conducting; the internal structure of plant organs.
- III.—Physiology.—Nutrition, the food of plants and its absorption, osmosis, root pressure, photosynthesis, translocation and storage of food, transpiration and exudations, the nutrition of parasites, saprophytes and insectivorous plants, growth, conditions influencing growth, growing regions in plant. Metabolism, the cycle of plant energy, respiration, enzymes, and the digestion of reserve food. Response to stimuli as evinced in the structure and movement of plants. Sexual and asexual reproduction.
- IV.—Ecology.—The reaction of plants to their environment as illustrated by aquatic plants, hygrophytes, mesophytes and xerophytes: floral mechanisms and seed dispersal.
- V.—Classification.—Principles of classification. A detailed knowledge of the following types and groups:—

Bacteria, Cyanophyceæ. Diatomaceæ, Conjugatæ, Chlorophyceæ (Protococcus and Oedogonium). Phæophyceæ (Fucus), Characeæ, Rhodophyceæ, Phycomycetes (Pythium), Ascomycetes (Clavviceps and Eurotium), Basidiomycetes, (Puccinia, Agaricus and Ustilago), Lichens, Hepaticæ (Fegatella), Musci (Funaria), Filicinæ (Nephrolepis), Equisetaceæ (Equisetum), Selaginellaceæ (Selaginella).

Cycadaceæ, Coniferæ, Gramineæ, Palmæ, Liliaceæ, Amaryllidaceæ, Scitaminaceæ, Orchidaceæ, Anonaceæ, Cruciferæ, Malvaceæ, Rutaceæ, Anacardiaceæ, Leguminosæ, Combretaceæ, Myrtaceæ, Cucurbitaceæ, Rubiaceæ, Compositæ, Apochynaceæ, Aselepiadaceæ, Convolvulaceæ, Solanaceæ, Scrophulariaceæ, Verbenaceæ, Labiatæ, Amarantaceæ, Nactaginaceæ, Euphorbieceæ, Urticaceæ.

VI.—Evolution.—Theories of Evolution; Genetics including the work of Mendel.

Practical Examination.

Each candidate must produce a certificate from the Head of the Department of his College that he has completed in a satisfactory manner a practical course on the lines laid down from time to time by the Academic Council, on the recommendation of the Board of Studies and that his laboratory journal has been properly kept. Every candidate must have recorded his observations directly in his laboratory journal and written therein a report on each exercise performed. Every journal is to be signed periodically by a member of the laboratory staff. Candidates are to produce their laboratory journals at the practical examination.

The practical examination shall include detailed botanical description of plants; the identification of the natural orders mentioned in paragraph V above; the use of a flora (the natural order being given) to identify phanerogamic genera and species; the making of hand sections of plant parts for microscopic examination.

The two papers and two practicals shall deal with the following subjects.

Paper I and Practical.—External Morphology, Classification, Evolution—75 marks.

Paper II and Practical—Internal Morphology, Physiology, Ecology—75 marks.

(ia) Botany (Revised Syllabus).* Pass Examination.

(Two Papers each of 75 marks and two Practical Examinations each of 25 marks).

(i) External Morphology:

The detailed morphology of the root, shoot and reproductive organs (including fruit and seed where present) in Pteridophytes and Spermatophytes.

(ii) Internal Morphology:

The structure of the cell; methods of cell division; tissues, primary and secondary meristems, parenchyma, prosenchyma, vascular or conducting tissues, tracheal and sieve tube tissue, laticiferous and glandular tissue; tissue systems-epidermal, ground and vascular or conducting. The internal structure of plant organs.

^{*}The first examination under the Revised Syllabus will be held in March 1940.

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(iii) Physiology:

Nutrition, the food of plants and its absorption, osmosis, root pressure, photosynthesis, translocation and storage of food, transpiration and exudation; the nutrition of parasites, saprophytes and insectivorous plants. Growth, conditions influencing growth, growing regions in plants. Metabolism, the cycle of plant energy, respiration, enzymes and the digestion of reserve food. Response to stimuli as evinced in the structure and movement of plants. Sexual and asexual reproduction.

(iv) Ecology:

The reaction of plants to their environment as illustrated by hydrophytes, hygrophytes, mesophytes and exerophytes; floral mechanisms and seed dispersal.

(v) Evolution:

Theories of Evolution; Genetics including the work of Mendel.

(vi) Classification:

The general principles underlying the main divisions of the vegetable kingdom as illustrated by the detailed study of the structure and life history* of the following types:—

Bacillus, Yeast, Mucor, Spirogyra, Moss, Nephrolepis, Cycas, Sunflower, Nymphoea and Maize.

Practical Examination.

Each candidate must produce a certificate from the Head of the Department of his College that he has completed in a satisfactory manner a practical course on the lines laid down from time to time by the Academic Council on the recommendation of the Board of Studies and that his laboratory journal has been properly kept. Every candidate must record his observations directly in his laboratory journal. Every journal is to be signed periodically by a member of the laboratory staff and certified by him at the end of the year. Candidates are to produce their journals at the practical examination and such journals may be taken into account by the Examiners in assigning marks.

Practical work.

(1) The recognition, dissection, examination and description of the above-mentioned plants and parts of them.

(2) The use of the microscope in examining the structure of plants. The preparation of the above-mentioned plants and parts of them for the microscope.

Honours Examination.

(Two Papers and two Practical Examinations each of 75 marks.)

(i) External Morphology:

The detailed morphology of the root, shoot and reproductive organs (including fruit and seed where present) in both Pteridophytes and Spermatophytes.

^{*}The detailed study of the structure and life history includes the detailed study of the gametophyte.

(ii) Internal Morphology:

The structure of the cell; methods of cell division; tissues, primary and secondary meristems, parenchyma, prosenchyma, vascular or conducting tissue (tracheal and sieve tube), laticiferous and glandular tissues; tissue systems, epidermal, ground and vascular or conducting and mechanical; the internal structure of plant organs.

(iii) Physiology:

Nutrition, the food of plants and its absorption, osmosis, root pressure, photosynthesis, translocation and storage of food, transpiration and exudation, the nutrition of parasites, saprophytes and insectivorous plants. Growth, conditions influencing growth, growing regions in plants. Metabolism, the cycle of plant energy, respiration, enzymes and the digestion of reserve food*. Response to stimuli as evinced in the structure and movement of plants and plant parts. Sexual and asexual reproduction.

(iv) Ecology:

Ecological factors. Reaction of plants to their environment as illustrated by hydrophytes, hygrophytes, mesophytes and xerophytes; floral mechanisms and seed dispersal.

(v) Classification:

Principles of classification. A detailed knowledge of the following types and groups:—

Bacteria, Cyanophyceæ (Gleocapsa, Nostoc, Oscillaria, Rivularia, Scytonema), Diatomaceæ, Conjugatae (Cosmarium, Zygnema, Spirogyra), Chlorophyceæ (Protococcus, Volvox, Ulothrix, Oedogonium and Vaucheria), Phaeophyceæ (Fucus), Characeæ (Chara), Rhodophyceæ (Batrachospermum), Phycomycetes (Pythium), Ascomycetes (Eurotium and Claviceps), Basidiomycetes (Ustillago, Puccinia and Agaricus), Lichens, Hepaticeæ (Marchantia), Musci (Funaria), Filicinæ (Nephrolepis), Equisetaceæ (Eqinsctum), Selaginellaceæ (Selaginella).

Cycadaceæ, Coniferæ, Gramineæ, Palmæ, Liliaceæ, Amaryllidaceæ, Seitaminaceæ, Orchidaceæ, Anonaceæ, Cruciferæ, Malvaceæ, Rutaceæ, Anacardiaceæ, Leguminosæ, Combretaceæ, Myrtaceæ, Cucurbitaceæ, Rubiaceæ, Compositæ, Apocynaceæ, Asclepiadaceæ, Convolvulaceæ, Solanaceæ, Scrophulariaceæ, Verbenaceæ, Labiatæ, Amarantaceæ, Nyctaginaceæ, Euphorbiaceæ, Urticaceæ.

(vi) Evolution:

Theories of Evolution; Genetics including the work of Mendel.

Practical Examination.

Each candidate must produce a certificate from the Head of the Department of his College that he has completed in a satisfactory

^{*} Candidates are not expected to be familiar with details of the chemical reactions involved.

manner a practical course on the lines laid down from time to time by the Academic Council, on the recommendation of the Board of Studies and that his laboratory journal has been properly kept. Every candidate must record his observations directly in his laboratory journal and write therein a report on each exercise performed. Every journal is to be signed periodically by a member of the laboratory staff and certified by him at the end of the year. Candidates are to produce their journals at the practical examination and such journals may be taken into account by the Examiners in assigning marks.

The practical examination shall include detailed botanical description of plants; the identification of the natural orders mentioned in paragraph V above; the use of a flora (the natural order being given) to identify phanerogamic genera and species; the making of hand sections of plant parts for microscopic examination.

The two papers and two practicals shall deal with the following subjects:—

Paper I—and Practical I—External Morphology, Classification, Evolution—75 marks each.

Paper II—and Practical II—Internal Morphology, Physiology, Ecology—75 marks each.

(ii) Zoology.

Pass Examination.

(Two Papers and two Practicals.)

General Biology-

The distinctive properties of living and non-living bodies.

Distinction between animals and plants.

The distinctive properties of protoplasm.

The cell, its structure, contents and its method of division.

An elementary knowledge of evolution.

A.—Plants.

- 1. The plant body, its parts, their forms and arrangement.
- 2. The internal structure of plants.
- 3. The functions of plant parts and tissues.
- 4. The principal divisions of the plant kingdom.

The above points are to be studied in an elementary manner from common plants and in addition the following types are to receive special attention—

Bacillus, Yeast, Mucor, Spirogyra, Nephrolepis, Cycas, Maize, Bean, Nymphaea.

B.—Animals.

Histology.—The different kinds of animal tissues: Blood, epithelia, connective tissue, cartilage, bone, muscles and nerves.

Physiology.—Irritability, respiration, secretion, excretion, circulation of blood and metabolism: The above treated in an elementary way.

Development.—Elements of reproduction, sexual and asexual; embryology of the frog's egg up to the formation of the germinal layers.

Candidates must show a personal acquaintance with dissection, structures, functions, and life-history of the following animals:—

Amœba, Paramœcium, Herpetomonas, Laverania, Leucosolenia, Hydra, Pheretima, Nereis, Hirudo, Tænia, Panulirus. Mosquito (external morphology only). Periplaneta, Ampullaria, Carchorias, Rana, Snake (Zamenis) and Lepust.

The descriptive characters of the principal Phyla and Classes of the animal kingdom with the following exceptions:—

Mesozoa, Nemertinea, Acanthocephala, Rotifera, Polyzoa. Brachiopoda, Chætognatha, Archi-Annellida, Echiuroidea, Sipunculoidea, Lower Chordates and Cyclostomata.

Practical Examination.

Every candidate shall complete a laboratory course in accordance with the regulations issued from time to time by the Academic Council, on the recommendation of the Board of Studies. Each candidate shall produce a certificate from the Principal of the College that he has completed in a satisfactory manner the prescribed course. Every candidate must record his observations directly in the laboratory journal. Every journal is to be signed periodically by a member of the laboratory staff and certified by him at the end of the year. Candidates are to produce their journals at the practical examination and such journals may be taken into account by the Examiners in assigning marks.

Practical Work.

- (1) The recognition, dissection, examination, and description, of the animals and plants and parts of them mentioned under A and B above.
- (2) The use of the microscope in examining the structure of animals and plants. The preparation of the animals and plants and parts of them mentioned under A and B above for the microscope.

Honours Examination.

(Two Papers and two Practicals.)

Cytology.—Cell, Mitosis, meiosis and Fertilization.

Histology.—Epithelia, Connective Tissues, Cartilage, Bone, Muscles, Nerves, Blood, Lymph, Tooth, Glandular Tissue (Pancreas, Liver, Gastric Glands, Spleen), Kidney and Reproductive Organs.

Physiology.—Elements of Animal Physiology as stated in the book recommended for the purpose.

Embryology.—Common types of Segmentation of the Zygote. Development of the Frog up to the formation of the three Germinal Layers.

Philosophy of Zoology.—Evidences of Organic Evolution, Evolutionary Theories of Lamarck, Darwin, De Vries, Weismann: Heredity: Mendelism.

Systematic Zoology.—All the classes of the animal kingdom should be studied as thoroughly as possible with the following exceptions:—

Mesozoa, Nemertinea, Acanthocephala, Rotifera, Polyzoa, Brachiopoda, Chætognatha, Archi-Annellida, Echiuroidea, Sipun-

Candidates must show a personal and practical acquaintance with dissections, structures, functions and life-history of such animals as may, from time to time, be prescribed by the Academic Council on the recommendation of the Board of Studies.

The following animals are at present prescribed:-

Amœba, Paramœcium, Vorticella, Herpetomonas, Laverania, Leucosolenia, Grantia, Hydra, Obelia, Tealia:, Tænia, Distomum, Nereis, Hirudo, Pheretima, Panulirus, Periplaneta, Culex or Anopheles, Placuna, Ampullaria, Ariophanta, Sepia, Asterias, Cucumaria, Carcharias, Rana, Calotes, Poisonous Snakes (identification only), Columba, and Legus.

The following larvæ should be studied :-

Cercaria, Trochophore, Nauplius, Megalopa, Zoæa, Glochidia and Ascidian Tadpole.

The skulls of the following:-

Orinthorhynchus, any Phelangeried, Macropus, Equus, Ovis, Canis and Pteropus.

Practical Examination.

Each candidate must produce a certificate from the Head of the Zoology Department of his College that he has completed in a satisfactory manner a practical course on the lines laid down from time to time by the Academic Council, on the recommendation of the Board of Studies, and that his laboratory journal has been properly kept. Every candidate must have recorded his observation directly in his laboratory journal. Every journal is to be signed periodically by a member of the laboratory staff. Candidates are to produce their laboratory journals and a series of not less than twelve preparations of animals or animal tissues for the microscope at the practical examination. Such journals may be taken into account by the Examiners in assigning marks.

The practical examination shall consist of dissections and detailed zoological description and identification of the animals prescribed above and preparation and identification of sections of animals and heir structure under the microscope prescribed as above.

The two papers and two practicals shall deal with the following subjects:—

Paper I.—Invertebrates, Cytology and Histology.

Paper II.—Vertebrates, Embryology and Evolution.

Practical I.—Dissection of animals.

Practical II.—Identification of animals and their parts, and viva voce.

Standard for Passing the Examination.

- Candidates who appear only for the Pass Degree Examination must, in order to pass the examination, obtain at least 30 per cent. of the full marks in (i) Compulsory English, and (ii) the Optional Group. In group (a) candidates must also obtain at least 25 per cent. of the full marks assigned to each language of the group and in groups (e) and (f) at least 30 per cent. of the full marks allotted to the practical examinations taken together.
- R. 32. A candidate who has obtained 40 per cent. of the total marks in any subject at any one examination may be excused from appearing in that subject (provided he has obtained the minimum in the practical of that subject required under Regulation 31) at a subsequent examination and will be declared to have passed the examination when he passes in the remaining subject as required under Regulation 31.
- R. 33. Candidates who appear for the Honours Examination in English, Latin, Greek, Sanskrit, Pali, Ardha-Magadhi, Avesta-Pahlavi, Persian, Arabic, Hebrew, German, French, Portuguese, Marathi, Gujarati, Urdu and Kannada, History and Economics or Mental and Moral Philosophy must obtain at least 30 per cent. of the full marks in (i) Compulsory English and (ii) the four Optional Pass Papers (taken together): Provided that if a candidate offers more than one language, he must obtain a minimum of 25 per cent. in each language.

Candidates who appear for the Honours Examination in English and offer to be examined in two extra-additional papers in lieu of two papers in a Second Language will be required to obtain a minimum total of 25 per cent. in the two extra papers in English and 30 per cent. of the marks assigned to the Voluntary Pass and extra additional Pass Papers taken together. The marks in the extra additional papers in English will not be counted for the purpose of the total to be obtained by candidates appearing in English Honours.

Candidates will be declared to have passed with First Class Honours if they obtain not less than 60 per cent. of the total number of marks in all the Honours Papers (as defined in Regulation 20) of the subject or group in which they appear for Honours and with Second Class Honours if they obtain not less than 45 per cent. of the total number of marks in all the above papers. Those who obtain less than 45 per cent. but not less than 30 per cent. in the Pass Papers will be entitled only to the Pass Degree and will be placed in the same

list with those who have obtained a Pass Degree. Candidates who offer only one language shall be eligible for a Pass Degree if they obtain 30 per cent. in the total of the seven papers, and if they fail to obtain a pass degree they shall not be compelled to keep terms in order to appear for a subsequent examination for the pass degree in languages.

- Of those candidates who appear for Honours in Mathematics, 34. R. Physics and Chemistry, or Botany and Zoology, and have obtained not less than 30 per cent. of the full marks in Compulsory English, such as have obtained not less than 60 per cent. in their Honours papers or papers and practical examinations as the case may be, will be declared to have obtained First Class Honours, and such as have obtained not less than 45 per cent. will be declared to have obtained Second Class Those who obtain less than 45 per cent. but not less than 30 per cent. will be entitled only to the Pass Degree, and will be placed in the same list with those who have obtained the Pass Degree, provided that in the case of those who appear in Physics and Chemistry or Botany and Zoology they have also obtained at least 30 per cent. of the full marks allotted to the practical examinations taken together. In Groups (e) and (f), candidates for Honours, in order to be entitled to Honours, must obtain also at least 30 per cent. of the full marks in the written papers and 40 per cent. in the practical examinations in each subject of the group.
- R. 35. Should, however, a candidate for the Honours examination in any subject fail under not more than one head of passing, he shall be declared to have passed the examination in the class to which his marks entitle him if, on a review of his marks, a majority of not less than two-thirds of the Examiners present decide that he should pass: Provided always that no candidate shall so pass unless he obtains an aggregate of at least 45 per cent. of the grand total of the marks for the whole examination.
- A candidate who has obtained 40 per cent. of the total marks in *R. 36. Compulsory English at any one examination but failed to pass in the Honours Examination will, if his Honours subject be a subject other than English, be excused the examination in Compulsory English and allowed to appear for the Honours Examination on a subsequent occasion. He will be required to take all papers excepting those in Compulsory English and will be eligible for First and Second Class Honours if he qualifies for them according to Regulation 33 or 34. A candidate appearing for an Honours Degree, who fails in Compulsory English but obtains at least 50 per cent. of the full marks assigned for Honours, will be allowed to take an Honours Degree in the class to which his marks entitle him on passing in Compulsory English at a subsequent examination. A candidate for an Honours Degree who fails in Compulsory English, but obtains at least 45 per cent. of the full marks in all the papers (or papers and practical examinations) of the Optional Group taken together, will be declared to have passed the

^{*} Candidates who have obtained not less than 45 per cent. marks but not more than 60 per cent. in their optional groups at the B. A. Honours Examination held in 1932 and previous years and who have still to appear in Compulsory English will be eligible for Second Class Honours after they pass in Compulsory English.

Pass Examination on passing in Compulsory English at a subsequent examination. Candidates passing the examination in compartments according to the provisions of this Regulation and Regulation 32 will not be eligible for any prizes or scholarships awarded at the examination.

R. 37. be per for the

A candidate who has been found qualified for a Pass Degree will be permitted to appear on a subsequent occasion at the examination for the degree of B. A. with Honours, provided he has completed the minimum attendance in a recognized College at a course of instruction in the subject in which he has to appear during two terms. He will be required to take all the Honours papers as defined in Regulations 20 and 21 and will be eligible for First or Second Class Honours if he qualifies for them according to Regulations 33 and 34. But a candidate, who previous to graduation, has attended during four terms Honours courses in a subject at an affiliated College but has qualified for a Pass Degree will not be required to keep any additional terms if he offers the same subject.

R. 38.

A candidate who has been found qualified for the Degree with First or Second Class Honours in any subject or group will be permitted to appear on a subsequent occasion for the Honours Examination in another subject or groups, provided he has completed the minimum attendance in a recognized College at a course of instruction in the subject in which he has to appear during two terms. He will be required to take all the Honours papers as defined in Regulation 20 and will be eligible for First or Second Class Honours if he qualifies for them according to Regulations 33 and 34. Candidates passing the examination according to the provisions of this Regulation and Regulation 37 will not be eligible for any prizes or scholarships awarded at the examination.

(5)—MASTER OF ARTS.

Admission.

0, 203.

- (a) Any person, being a Bachelor of Arts in the University of Bombay, may, after he has spent at least two years* subsequent to his passing the B. A. Examination, be admitted to the examination for the Degree of Master of Arts, and should he pass the examination in any one of the branches mentioned in Regulation 39, will be admitted to the degree of M. A.
- (b) A Bachelor of Arts of a University recognized by this University will also be admitted to this examination: Provided he submits with his application a certificate, signed by the Principal' of an affiliated Arts College or by a University Professor, Reader or Lecturer, to the effect that he has studied for the examination under the direction of Professors in any College affiliated to this University, or Professors, Readers or Lecturers in this University, for a period of two years after passing the B. A. Examination of his own University. Candidates appearing under the provisions of this Ordinance will not be eligible for the Chancellor's Medal awarded at the examination.

^{*}Subject to the provisions of Ordinance 74.

M. A.: SYLLABUS

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0. 204.

On a new application being forwarded and a fresh fee paid, a candidate who has already passed the examination for the M. A. degree, may present himself again for the same on a subsequent occasion, subject to the following conditions:—

(1) If he has passed in one branch, he may appear in another

branch.

(2) If he has passed in any one pair of languages, he may appear again in any other pair allowed by the Regulations, provided that each of the languages selected by him on a subsequent occasion is different from any in which he has passed on a previous occasion.

(3) If he has passed in any two groups of History, he may

appear in the remaining two groups.

4) If he has passed in one group of Mathematics, he may

appear in the other group.

(5) If he has obtained his degree by submitting a thesis in lieu of the whole examination, he may appear by papers in the same or any other branch, or by thesis, in the other groups of the same branch, or in any other branch.

(6) If he has obtained his degree by papers, or partly by papers and partly by thesis, he may appear by submitting a thesis in lieu of the whole examination in the same branch or in any other branch whenever it is

allowed by Regulations.

A candidate who thus re-appears in accordance with any of the rules above stated shall be entitled to receive the degree and will be eligible for a class, but not for University awards in the new branch or in the same branch, but with the new subject, provided always that no candidate shall be allowed to re-appear in another branch or another group of the same branch, unless he has done work for at least two additional academic years or four additional terms, under a recognized University Teacher or Teachers prior or subsequent to his passing the M. A. Examination on the first or the next preceding occasion as the case may be.

R. 39.

The Examination will comprise the following Branches:-

I.—Languages.

II.—History.

III.—Philosophy. IV.—Mathematics.

V .- Ancient Indian Culture.

*VI.—Islamic Culture.

Syllabus.

I—LANGUAGES.—(Eight Papers.)

†R. 40.

Subject to the proviso hereinafter contained and consistently with the options given below, candidates must offer any two languages, one

*The first examination under this branch will be held in 1940.

†The Proviso to the Regulation 40 in regard to the option of two additional papers in English in lieu of two papers in a subordinate language will apply to the M. A. examination to be held in 1940 and subsequent years.

of them being taken as a Principal language and the other as a Subordinate one. There will be six papers in the Principal language and two in the Subordinate language. There will also be an oral examination in each living language other than English and the Modern Indian Languages both for candidates who take the language as a Principal language as well as for those who take it as a Subordinate one: Provided, however, that a candidate taking English as a Principal language shall have the option of taking two additional papers in English in lieu of two papers in a Subordinate language.

Each paper in these languages will carry 100 marks where there is no oral examination and 90 marks where there is an oral examination. The oral examination will carry 60 marks if the language is taken as a Principal language and 20 marks if taken as a Subordinate one.

(i) The grouping of languages will be as follows:-

Group I.

English, French, German and Portuguese.

Group II.

Classical Groups.

(a) Latin, Greek. (f) Pali,* Ardha-Magadhi.†
(b) Latin or Greek, Sanskrit. (g) Hebrew, Arabic.

(c) Sanskrit, Avesta-Pahlavi. (h) Avesta-Pahlavi, Persian.

(d) Sanskrit, Pali.
 (e) Sanskrit, Ardha-Magadhi.
 (j) Persian, Sanskrit.

Group III.

Gujarati, Marathi, Kannada, Urdu.

(ii) The options will be allowed as follows:-

Option (A)—Any pair of Group I.

Option (B)—Any one of Group I with any other language.

Option (C)—Any Sub-group of II.

Option (D)—Any one of Group III with a related language in Group II.

For the purposes of Option (D), the following combinations are considered as related:—

- (i) Marathi with Sanskrit or Pali or Ardha-Magadhi or Hebrew.
- (ii) Gujarati with Sanskrit or Pali or Ardha-Magadhi or Persian or Avesta-Pahlavi.
- (iii) Kannada with Sanskrit or Ardha-Magadhi or Pali.(iv) Urdu with Persian or Arabic.

^{*}Subject to the condition that a candidate taking this language has passed in Sanskrit or Pali at any preceding examination conducted or recognized by this University.

[†]Subject to the condition that a candidate taking this language has passed in Sanskrit at any preceding examination conducted or recognized by this University.

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(1).—ENGLISH.*

In English there will be four courses in which six three hours' papers carrying 100 marks each will be set. Candidates taking English as the Principal language will be required to answer all six papers. Those who take English as Subordinate to another language will be required to answer Papers II and VI only.

Course I, Paper I .- Either.

- (a) English Literature and life up to 1450, illustrated by texts from Old and Middle English Literature,
- (b) English life and literature from 1300-1550, illustrated from Chaucer and other verse and prose of the period.

In either alternative, candidates will be required to translate passages from the prescribed texts into modern English. They will be expected to show a sound knowledge of the texts from the literary point of view and an acquaintance with the social life and customs and the outlines of the political history of the period selected.

Course II, Paper II.—A special study of five plays of Shakes-peare with their social background.

Paper III.—Shakespeare: a general study of his works, dramatic and lyric, in relation to the life, manners, and theatres, of the period.

Course III, Papers IV and V.—A special period of the history of Modern English Literature, together with particular study of three poets and three prose writers of the period. The period shall be the century following that prescribed for the Honours B. A. Examination two years previously. Paper IV should deal with the first 50 years history of literature and the particular study of the prescribed writers of that period. Paper V should deal with the next 50 years history of literature and the particular study of the prescribed writers of that period.

Course IV, Paper VI.—A special form of literature is to be studied in relation to the foreign models which have influenced growth and character.

[Note.—Answers to questions in all the six papers are expected to have the literary qualities and form of an essay, and Examiners shall bear this in mind in deciding the form of the questions and the number of them to be answered.]

(1A).—ENGLISH. (Revised Course) † Subordinate English.

Paper I.—Shakespeare's plays in general with detailed study of five of them to be prescribed by the Board from time to time.

Paper II.—History of English Literature since 1890.

*The last examination under the existing course will be held in April 1939. †The first examination under the Revised Course will be held in April 1940.

Principal English.

- Paper III.—History of English Literature from 1400 to 1700 with special study of three authors to be prescribed by the Board from time to time.
- Paper IV.—History of English Literature from 1700 to 1890 with special study of three authors to be prescribed by the Board from time to time.
- Paper V.—A special form of Literature to be studied in relation to the foreign models which have influenced its growth and character. Texts will be prescribed by the Board from time to time.
- Paper VI.—History of Literary Criticism in English with special knowledge of critical works to be prescribed by the Board from time to time.

Alternatives to the Second Language.

- Paper VII.—Old English: History and Literature of Pre-Norman England with texts to be prescribed by the Board from time to time.
- Paper VIII.—Middle English History and Literature of England from 1066 to 1400 with texts to be prescribed by the Board from time to time.

(2).—LATIN.

Subordinate.

Paper I.—Unseen passages for translation and composition.

Paper II.—Select texts from the Latin Literature along with the history of the literature represented by the same texts.

Additional for Principal.

- Paper III.—A general account of the origin and growth of the Latin language, and its linguistic character.
- Paper IV.—On the political, social and religious life of Ancient Rome.
- Papers V and VI.—On the prescribed books, including points of scholarship and criticism.

(3).—GREEK.

Subordinate.

Paper I.—Unseen passages for translation and composition.

Paper II.—Select texts from the Greek Literature along with the history of the literature represented by the same texts.

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Additional for Principal.

Paper III.—An account of the origin and the growth of the Greek language, its general linguistic nature and the main characteristics of the chief Greek dialects.

Paper IV.—On the political, social and religious life of Ancient Greece.

Papers V and VI.—On the books prescribed, including points of scholarship and criticism.

(4).—HEBREW.

Subordinate.

Paper I.—Unseen passages for translation and composition.

Paper II.—Select texts from the Hebrew Literature along with the history of the literature represented by the same texts.

Additional for Principal.

Paper III.—An account of the origin and growth of the Hebrew language, its linguistic character, and its relation to Western Aramaic and Neo-Hebraic (Mishnaic) languages.

Paper IV.—On the political, social and religious life of the people.

Papers V and VI.—On the books prescribed, including points of scholarship and criticism.

(5).—PERSIAN, ARABIC AND URDU.*

Subordinate.

Paper I.—One paper on prescribed poetry texts, including points of scholarship and criticism, and unseen passages for translation both from and into the language.

Paper II.—One paper on prescribed prose texts, including points of scholarship and criticism, and unseen passages for translation both from and into the language.

Additional for Principal.

Paper III.—One paper on prescribed poetry texts which will be of a more difficult character than those for the subordinate papers, including points of scholarship and criticism.

Paper IV.—One paper on prescribed prose texts which will be of a more difficult character than those for the subordinate papers, including points of scholarship and criticism.

^{*}Candidates who offer Modern Indian Languages shall answer all the questions in the papers in these languages except the one for translation into English in the Modern Indian Languages they offer.

Paper V.—One paper containing unseen prose and poetical passages for translation from English into the language and vice versa, including in the latter, explanation, if desired.

Paper VI.—A general paper containing—

- (a) An essay in the language on a subject connected with the history of the literature or the subjects of the prescribed books, carrying about half the marks.
- (b) Paraphrase in the language of an unseen passage, general questions on the texts and on the history of the language and literature, and on philosophy, prosody and rhetoric, carrying about half the marks.

A candidate may offer a thesis in lieu of the four principal papers in Persian or Arabic on the following conditions:—

- (a) At least six months before the date of the examination, the candidate shall submit his application to the University, stating the subject of his thesis, the work already done by him in that subject, and the course of reading and the method of treatment adopted for the thesis. The candidate shall also indicate what he considers as the special importance, and the claim to originality, of his work on the thesis.
- (b) The above application shall be endorsed by the University Professor, or by an approved Professor of Persian or Arabic in an affiliated Arts College, or by some other scholar recognized by the University, under whose guidance the candidate is working, certifying that the subject of the thesis is a proper one and that the reading and research work done by the candidate is sufficient to make the thesis an equivalent of the four papers in either language.
- (c) A copy of the thesis written in a neat, legible hand shall be submitted in triplicate to the University, at least four months before the date of the examination, along with a declaration by the candidate that the thesis is bona fide his own work, the Board of Studies thereupon appointing at least two Judges for the thesis.
- (d) The submission of a thesis will not be a bar to the candidate's appearance at the ordinary examination.

(6).—FRENCH.

Subordinate.

Paper I.—Translation from French into English and English into French. (All unseens.)

Paper II.—A paper on two modern authors, including points of scholarship and criticism. (Texts prescribed.)

Additional for Principal.

Paper III.—A paper on Early French, both language and literature, including points of scholarship and criticis m. (Authors prescribed.)

Paper IV.—A period of the history of French literature.
(Books to be prescribed from time to time.)

Paper V.—A form of literature or a literary movement. (Books to be prescribed from time to time).

Paper VI.—An essay to be written in the French language.

(7).—GERMAN.

Subordinate.

Paper I.—Translation of Unseens: English-German, German-English and Paraphrase.

Paper II.—Special period of Modern German Literature with particular study of two prose writers and two poets.

Additional for Principal.

Paper III.—Special form of German Literature.

Paper IV .- Middle High German :-

- (a) Middle High German texts and Grammar: Acquaintance with Old High German Grammar sufficient to enable the candidates to explain the forms of Middle High German will be expected;
- (b) Middle High German Period of Literature: A knowledge of the literature of the period as well as of the social and political conditions is required.
- Paper V.—Prose and poetry texts bearing on the special form and the special period of German Literature under Papers II and III, including the texts under Paper II.
- Paper VI.—An essay in German on a topic from the German Literary History or from the Social or Political History of Germany in the 18th and 19th centuries with a bearing on German Literature.

(8).—PORTUGUESE.

- [N. B.—Papers I and III only are to be answered by those taking Portuguese as the Subordinate Language.]
 - Paper I.—Unseens: Translation from English into Portuguese and vice versa.
 - Paper II.—A study of the Portuguese language with special reference to some *prescribed* specimens of Pre-Camonean literature.
 - Paper III.—A detailed and critical study of a prescribed portion of Camoens' works. [Some questions may be required to be answered in Portuguese.]
 - Paper IV.—A general study of all the works of Camoens with relation to his life and age.

Paper V.—A prescribed period of the History of Portuguese Literature. The period shall be that following the period prescribed for the B. A. Examination two years before.

Paper VI.—A special study of two poets and two prose-writers of the period prescribed for Paper V, with particular reference to some of their prescribed works (i. e., Texts other than Camoens and pre-Camonean.)

[Note.—Answers to questions in all the six papers are expected to have the literary qualities and form of an essay, and Examiners shall bear this in mind in deciding the form of the question and the number to be answered.]

(9).—SANSKRIT, PALI, ARDHA-MAGADHI AND AVESTA-PAHLAVI.

Subordinate.

Papers I and II.—Select Texts.

Additional for Principal.

Paper III.—Unseen passages for translation from and into the language and composition in the Principal Language.

Sanskrit.

Paper IV .- Rgveda and Nirukta.

Papers V and VI.—On any one out of the eleven Sastras prescribed.

Ardha-Magadhi.

Paper IV .- The Agama Literature, and linguistic study.

Papers V and VI.—The Philosophical Literature (corresponding to Sāstra paper in Sanskrit.)

Pali.

Paper IV.—The Older Nikayas, and linguistic study. Papers V and VI.—The Abhidhammal Literature.

Avesta-Pahlavi.

Paper IV.—The five Gathas of Avesta.

Papers V and VI.—The rest of Avesta and Pahlavi.

A candidate may offer a thesis in lieu of the four *Principal* papers in Sanskrit, Pali and Ardha-Magadhi on the following conditions:—

(a) At least six months before the date of the examination the candidate shall submit his application to the University, stating the subject of his thesis, the work already done by him in that subject, and the course of reading and the method of

treatment adopted for the thesis. The candidate shall also indicate what he considers as the special importance, and the claim to the originality, of his work on the thesis.

- (b) The above application shall be endorsed by the University Professor, or by an approved Professor in that language in an affiliated Arts College, or by some other Scholar recognised by the University, under whose guidance the candidate is working, certifying that the subject of the thesis is a proper one and that the reading and research work done by the candidate is sufficient to make the thesis an equivalent of four ordinary papers.
- (c) A typed copy of the thesis (written in English) shall be submitted in triplicate to the University at least two months before the date of the examination, along with a declaration by the candidate that the thesis is bona fide his own work, the University thereupon appointing at least two Judges for the thesis.
- (d) After the candidate's application for the examination by thesis is admitted, the candidate shall not be allowed to take in that same year the ordinary examination by papers in lieu of the one by thesis.

(10).—MARATHI.*

Subordinate.

- Paper I.—A special form of literature with special reference to the various forces that moulded that form, some typical texts being prescribed for study.
- Paper II.—(a) Suitable prose and poetical texts of the modern period.
 - (b) A general outline of the history of the Marathi Language and Literature.

Additional for Principal.

- Paper III.—A suitable period of Marathi Literature with a special study of some specified authors of that period for detailed and intensive study.
- Paper IV.—A study of the origin, structure and development of the language, including its principal dialects with special reference to philosophy.
- Paper V.—Prescribed texts of the mediæval period of the language.
- Paper VI.—(a) Unseen passages for translation from English into Marathi.
 - (b) Unseen passages in Marathi for explanation and criticism in Marathi.
 - (c) Composition in Marathi.

^{*}Candidates who offer Modern Indian Languages shall answer all the questions in the papers in these languages except the one for translation into English in the Modern Indian Languages they offer.

(11).—GUJARATI.*

The syllabus in Marathi applies mutatis mutandis to Gujarati except as regards Papers I and VI being interchanged.

(12).—KANNADA.*

Subordinate.

Paper I.—A candidate will be required to show a knowledge of the whole course of the history of Kannada Literature, with a special knowledge of the works of 3 or 4 authors of the particular period or form of literature to be prescribed from time to time.

Paper II.—A detailed study of four standard works of Classical Kannada literature and two books of modern literature. This paper shall contain passages to test the ability to paraphrase.

Additional for Principal.

Paper III.—Advanced Grammar, Prosody and Poetics. (Books to be prescribed.)

Paper IV.—A general account of the origin, structure and growth of the Kannada Language and its relation to allied languages as per detailed syllabus.

Paper V.—A special study of the works of the representative Jaina, Brahmana or Lingayata authors, with particular reference to the social, religious and philosophical aspects of their works. (Books to be prescribed).

Paper VI.—An essay or essays in Kannada bearing on Early Karnatak Culture. (Books to be recommended for reference.)

R. 41.

II.—HISTORY.—(Eight Papers.)

Candidates may (at their option) submit to a written examination of eight papers in any two of the following four groups, or they may offer a thesis on a subject dealt with in any of these groups in lieu of the whole of the written examination.

Group A.

- 1. English Constitutional History.
- 2. A special period of Indian History to be chosen from the following or a special period of Ancient Persian History:—
 - (a) Ancient India.
 - (b) Mahomedan India.

^{*}Candidates who offer Modern Indian Languages shall answer all the questions in the papers in these languages except the one for translation into English in the Modern Indian Languages they offer.

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(c) The Maratha period.

- (d) European Powers in India.
- 3. Theory of Politics.
- 4. Comparative Politics.

Group B.

- 1. Mediæval History.
- 2. Modern History.
- 3. British Colonial History.
- 4. Historical Essay.

Group C.

- 1. Economic History.
- 2. Advanced Economic Theory.
- 3. Indian Economics.
- 4. An Essay on Economics.

Group D.

- 1. Nature and Scope of Sociology.
- 2. Social Institutions.
- 3. Indian Social Institutions.
- 4. Sociological Essay.

R. 42.

III.—Philosophy.—(Eight Papers.)

[N. B.—Candidates may (at their option) submit to a written examination of eight papers as described below, or they may offer a thesis connected with one or more of the subjects prescribed for the papers in lieu of the whole of the written examination.]

A.—Compulsory Papers.

- 1. History of Ancient Philosophy. (One Paper.)
- 2. History of Modern Philosophy. (One Paper.)
- 3. Moral Philosophy. (One Paper.)
- 4. Psychology. (One Paper.)

B.—OPTIONAL PAPERS.

(i) Philosophy.

- 1. Natural Theology or the History of Indian Philosophy, (One Paper).
 - 2-3. Any two of the following Philosophies (Two Papers):-
 - (a) The Philosophy of Plato.
 - (b) The Philosophy of Aristotle.
 - (c) The Philosophy of Kant.
 - (d) Sankhya.
 - (e) Buddhism.
 - (f) The Advaita of Shankaracharya.
 - (g) Vishishtadvaita of Ramanujacharya.
 - 4. Essay. (One Paper.)

OR

(ii) Sociology.—(Four Papers.)

(i) NATURE AND SCOPE OF SOCIOLOGY.—(One Paper.)

Origin and progress of Sociology, in observation and interpretation of human societies in their life and working their institutions and products; concrete studies thus becoming general.

Sociology especially aided by studies of life and mind (Biology and Psychology). Conception of Evolution ("progress" or "deterioration") in societies.

Other associated sciences; leading classifications of the sciences and arts.

Social life and organization thus influenced by various factors: (a) Physical and geographic (climate and natural resources as determining fundamental occupation); (b) Biological: nutrition and reproduction, heredity and variation, Ethnography; (c) Psychological factors; (d) Ethical factors; (e) Religious factors; (f) All these through time (Historic factors).

Outlines of Archæology. Palæolithic and Neolithic ages; Bronze and Iron ages.

Main Historic Periods of Western and Indian Civilization.

(ii).—Social Institutions.—(One Paper.)

Forms of Social Organisation.

Economic Organization.

Main types of occupation; their later and modern developments. Slavery and Serfdom.

Contract and Wages.

Forms of Industrial Co-operation.

Class and Caste distinctions.

Other Forms of Social Organisation.

Constructive elements in human life.

Sex and the family; position of woman; history of marriage.

Paternal and maternal descent; property and inheritance.

Educational systems.

The clan; the tribe; the caste; the race; the nation.

The State; City-states, modern States, Empires and larger groupings.

Village, town, and city; conditions of city development: methods of survey.

Origin and Growth of Moral and Religious Ideas.

Early beliefs: their relation to family, marriage, position of woman, property, clan and tribe, treatment of strangers, etc.

Further moral developments; Moral education as social.

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Religious institutions, rituals and priesthoods. Social value of Religion. Significance of Art.

Social Order and Law.

Disruptive forces in life: Blood-feuds, Retaliation, Compensation, etc.

Primitive Courts and Processes: Growth of public Justice.

Social Evils : Poverty, Ignorance, Vice and Crime, etc.

Responsibility: Punishment and prevention of crime.

Economic and social conditions (and moral conceptions) as modifying past laws and evolving new ones.

Administration, municipal and general.

Civil Equality and Political Liberty.

Study of Sociology as introductory to Political Science and Philosophy and helpful towards Social Service.

(iii)—Indian Social Institutions.—(One Paper.)

The village. The caste. Phanchayats. The family (Matriarchal, Malabar system and traces elsewhere). Marriage. Adoption. Education. Foreign elements. Assimilation and Segregation. The Depressed Classes.

Mahomedan influence, and influence on Mahomedans of Indian Institutions. Law and Custom. The sphere of the State. Effects of British Rule on Indian Society.

(iv).—Essay.—(One Paper.)

IV.—MATHEMATICS.—(Eight Papers.)

R. 43. [N. B.—If a candidate has passed his M. Sc. Examination in one of the Mathematics Groups A or B, he will have to appear for the other group to qualify for the degree of M. A.]

Candidates must select one of the following Groups.

GROUP A-Pure Mathematics.

Paper I.—Algebra and Theory of Equations.

Paper II.—Solid Geometry.

Paper III.—Pure Geometry, Plane and Spherical Trigonometry.

Paper IV .- Plane Analytical Geometry and Higher Plane Curves.

Papers V and VI.-Modern Analysis, Differential Equations.

Paper VII.—Statics, Attractions, Dynamics of a particle and of rigid bodies.

Paper VIII.—Hydrostatics, Spherical Astronomy.

Instead of Papers VII and VIII, candidates may offer any one of the following groups on which two papers will be set:—

- 1. Higher Algebra and the Theory of Finite Groups.
- 2. Theory of Functions of a Real Variable.
- 3. Theory of Functions of a Complex Variable.
- 4. Elliptic Function and Algebraic Functions.
- 5. Theory of Numbers.
- 6. Differential Equations.
- 7. Projective Geometry, Non-Euclidean Geometry and Line-Complex.
- 8. Differential Geometry.
- 9 Fourier's Series and Harmonic Analysis.
- 10. Calculus of Variations and Integral Equations.

GROUP B .- Applied Mathematics.

Paper I.—Differential and Integral Calculus, Solid Geometry.

Paper II.—Differential Equations, Fourier's Series and Spherical Harmonies.

Paper III.—Statics, Attractions and Theory of Potential, Elementary Elasticity.

Paper IV.—Dynamics of a particle, Rigid Dynamics.

Paper V.—Hydrostatics, Hydrodynamics and Sound.

Paper VI.—Electricity and Magnetism, Relativity.

Papers VII and VIII.—Two papers on any one of the following groups.

1. Elasticity.

2. Higher Dynamics.

- 3. Hydrodynamics and Theory of Tides.
- Optics and Sound.
 Celestial Mechanics.
- 6. Electricity and Magnetism and Relativity.

In each of the above groups the requisite knowledge of Vector-analysis and Quaternions will be assumed.

- R. 44.
- (a) A candidate selecting any one of the special subjects in Group A or B must intimate his intention of so doing to the Registrar at least six months before the date of the examination and should further indicate the general extent and nature of his reading.
- (b) Instead of the Papers (VII and VIII) in a special subject in the Mathematics (Groups A and B) courses for the M. A. and M. Sc. Examinations, a candidate may present a thesis on any particular branch of his special subject and if this thesis gives evidence of orginality either in method or results according to a report by the referees appointed in consultation with the Board of Studies, the candidate will be excused from appearing in these two papers. If, in the opinion of the referees, the thesis shows exceptionally high merit, the candidate may at his option be excused from any two more papers required in the examination.

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- (c) This option shall be granted only to candidates who have passed either the B. A. Examination with Honours in Mathematics or the B. Sc. Examination with Mathematics as their Principal Subject at least in the Second Class.
- (d) Every thesis shall be certified by a Professor of this University or by an approved Professor of an affiliated College as being mainly the student's own work.
- (e) Every thesis shall be prefaced by a statement showing what results were already known on the subject matter of the thesis and what the candidate claims as his own contribution in method or results of both.
- (f) The thesis will be referred to referees only if the Board of Studies considers that there is a prima facie case for doing so.
- (g) The referees may require the candidate to submit to an oral test on the subject matter of the thesis, if necessary.
- (h) Every candidate desirous of submitting a thesis must intimate his intention of doing so, in writing, to the Registrar at least six months before the examination. The thesis itself should be submitted four months beforehand in triplicate.

Text-books will be recommended at least two years before the commencement of the examination.

R. 45.

V .- ANCIENT INDIAN CULTURE .- (Eight Papers.)

- (1) Origin and Evolution of Indian Social and Political Institutions (Two Papers).
- (2) Origin and Development of Indian Religion and Philosophy (Two Papers).
 - (3) Archæology and Epigraphy (One Paper).
 - (4) Linguistic data as source for Cultural History (One Paper).
 - (5) Early Literature (One Paper).
 - (6) Early History up to 800 A. D. (One Paper).

R. 45A.

*VI.—ISLAMIO CULTURE.—(Eight Papers).

- Paper I. Languages: Persian and Arabic (working knowledge of). The paper to consist of unseen passages(of prose and poetry of the Intermediate Examination standard) of both the languages to be translated into English.
- Paper II. Islam during the time of the Prophet and the First Four Khalifs.
- Paper III. Political and Cultural Progress of Islam under the Umayyads and the Abbasids.
- Paper IV. Islamic Culture in Spain and Egypt (including its influence on Egypt).
- Paper V. Islamic Culture in Persia and Central Asia.
- Paper VI. Islamic Culture in India (including a study of the influence of Indian Culture on it.)

^{*}The first examination in the Branch of Islamic Culture will be held in April 1940.

Paper VII. Islamic Philosophy, Theology and Mysticism. Paper VIII. Islamic Sciences, Arts and Sociology.

Standard for Passing the Examination.

- R. 46.
- (a) To pass the M. A. Examination in Languages, a candidate must obtain 25 per cent. marks in each of the eight papers, 30 per cent. in the total of the two papers in his Subordinate language and 40 per cent. in the total of the six papers in his Principal language. A candidate offering a thesis in lieu of the four Honours Papers in his Principal language must obtain, in order to pass the examination, 25 per cent. of the full marks in each of the four papers in which he appears, 30 per cent. in the total of the two papers in his Subordinate language, $37\frac{1}{2}$ per cent. in the thesis and 40 per cent. in the thesis and two Pass papers in the Principal language taken together.
- (b) To pass the examination in History, Philosophy, Ancient Indian Culture and Islamic Culture, the candidate must obtain (i) one-fourth of the full marks in each paper; and (ii) three-eighths of the total marks obtainable.
- (c) To pass in Mathematics, the candidate must obtain either (i) one-fourth of the full marks in each paper and (ii) three-eighths of the total marks obtainable, or 40 per cent. of the total marks obtainable.
- (d) Those of the successful candidates who obtain 65 per cent. of the total marks will be placed in the First Class and those obtaining 50 per cent. in the Second Class. Further, in the languages group, even if a candidate does not satisfy the above condition, but gets 75 per cent. in the total of the papers in the Principal language only, he will be placed in the First Class, and if he obtains 60 per cent. in the total of the papers in the Principal language only, he will be placed in the Second Class.
 - (5A)—For the M.A. Examination (By Thesis) in History and Philosophy.

Ordinances.

- 0. 204A.
- A thesis can be submitted under the following Regulations only in History and Philosophy.
- 0. 204B.
- Any person being a Bachelor of Arts of this University or of a University recognized by this University shall be eligible for the Degree of Master of Arts (by thesis).
- 0. 204C.
- Every candidate must, unless specially exempted by the Syndicate as provided in Ordinance 74, work under a University Professor, a whole-time University Teacher or a University Teacher. He shall register as a postgraduate research student at the office of the University Registrar within one month of his admission as a research student.
- 0. 204D.
- On completion of a period of four terms or two calendar years as a postgraduate research student, a candidate may submit a thesis for the degree, provided that the University Professor or University Teacher under whom he has been working certifies that it is worthy of examination.

Chap. XXXIV] F. Y. COMMERCE: EXAMINATION

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0. 204E. Two months before submitting the thesis the candidate shall forward to the Registrar, through his University Professor or University Teacher, a statement giving the title and a synopsis of the thesis along with a fee of Rs. 75.

0. 204F. No further fee shall be charged to a candidate who re-submits his thesis for examination under the latter part of Regulation 46 F.

Regulations.

R. 46A. Candidates are permitted to submit theses at any time during the year subject to the provision of Ordinance 204 E.

R. 46B. The candidate shall submit his thesis in triplicate.

R. 46C. The thesis shall be the candidate's own work, carried out under the guidance or supervision of his teacher.

R. 46D. The thesis shall be either (i) a critical analysis of existing data, or (ii) a record of investigation, or (iii) a combination of these.

R. 46E. The Board of Studies shall suggest to the Academic Council the name of one referee who shall not be the University Professor or University Teacher under whom the candidate has worked, to whom the thesis shall be submitted and who shall, after consulting the University Professor or University Teacher who has been guiding the student, report through the Board to the Academic Council, whether he recommends that the thesis be accepted for the degree or rejected. The report of such referee shall be final. If the referee recommends that the thesis be accepted, the candidate shall be declared to have qualified for the degree.

R. A thesis that has been rejected may be submitted again after due revision and subject to the provisions of Ordinances 204 D and 204 E, and Regulation 46B.

BACHELOR OF COMMERCE.

GENERAL.

• Candidates for the Degree of Bachelor of Commerce (B. Com.) must have passed the Matriculation Examination, and will be required to pass two subsequent examinations, the first to be called the Intermediate Examination in Commerce, and the second the Examination for the Degree of Bachelor of Commerce.

0. 205A. (5B) FIRST YEAR COMMERCE EXAMINATION.*

During the first year there shall be no University Examination for a candidate proceeding to a degree in Commerce. Such a candidate will be permitted at the end of the first year to enter on a course for

^{*}The First Year Commerce examination under the Bifurcation scheme will be held for the first time in March, 1939.

the Intermediate Examination in Commerce, provided that he produces a certificate from the Principal of a Commerce College showing that he has kept two terms at a College affiliated to the University and has satisfactorily carried out the work appointed by the University for the first two terms in Commerce.

- Heads of Colleges are empowered to charge for each candidate who applies to be examined a fee of not more than Rs. 10. The Head of each College shall also collect and forward to the Registrar of the University a fee of Rs. 10 for each candidate who has been certified and shall submit the names of all the candidates who have been certified in accordance with the above Ordinance (Ordinance 205 A) and the names of such candidates shall be registered by the University.
- R. 466. The following are the subjects appointed by the University for the first two terms in Commerce:—
 - 1. English.
 - 2. Elementary Book-keeping and Commercial Arithmetic.
 - 3. Elementary Economics.
 - 4. Regional and Commercial Geography.
 - 5. Methods and Machinery of Business.
 - 6. Composition in=
 - (a) English
 - (b) A Modern Indian Language
 - (c) French
 - or
 - (d) German.

Syllabus.

R. 46H. 1. English: (Two Papers):—

Paper I—English Prose

(Text-books to be recommended by the Board of Studies in Commerce.)

Paper II—Composition (including an Essay) and commercial terms and phrases.

R. 46 I. 2. Elementary Book-keeping and Commercial Arithmetic: (One Paper):—

Rapid Methods of Calculation with special reference to the following commercial items:—

Interest, Average due date, Rates, Taxes, Commissions, Stock Exchange, Securities, Partnerships, Bankruptcy, Foreign Exchanges, Bills, Banking and Insurance.

Elements of Book-keeping :-

Double Entry Book-keeping : its principles and advantages:—

(a) Journalizing and posting transactions involving cash and credit purchases and sales; receipts and pay-

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ments in cash and through bankers; Treatment of and Bills receivable and Bills payable; rent, salaries and trade charges, and bad debts; real, personal and nominal accounts. Preparation of a Trial Balance, Trading Account, Profit and Loss Account and Balance Sheet and single adjustments.

- (b) Preparation of Cash Books with discount cash and bank columns; Bought and Sold books; Bills Receivable and Bills Payable Books; Invoices, Account Sales, Accounts Current.
- (c) Indian Book-keeping and its peculiarities. Differences in the nomenclature of Indian and English books of account.

Questions on Commercial Arithmetic shall be compulsory.

R. 46 J. 3. Elementary Economics: (One Paper):—

(Only elementary notions to be studied.)

General Notions: Economic welfare; effect of climate and physical surroundings on economic development; influence of social and religious customs and institutions.

The human factor in economics and the population problem; division of labour.

Economic Organization; Agriculture; Rural Industries; factory production: localization of industries; organization of modern industries; Trade and Transport; Joint-Stock companies; Banks.

Wants and their satisfaction.

Laws of Demand and Supply.

Standard of Life.

National Income and Wealth.

Welfare work and Labour Legislation.

R. 46K. 4. Regional and Commercial Geogaphy: (One Paper):—

Man in relation to his environment, race, habitation, population movements, habits and customs.

Physical Geography as a basis of the various types of civilisation and as a determining factor of national and economic development.

A study of geography of the following countries and the study to include:—

(a) Causes of backwardness and progress.

(b) Distribution and Density of population.
 (c) Economic resources, raw materials and sources of

power.
(d) Means of communications and important trade routes.

(e) Important Commercial towns and chief ports.

f) Foreign trade.

Countries.

India and countries adjacent to its frontiers.

Great Britain,

United States of America,

Germany,

France,

Italy,

Russia,

China and

Japan.

R. 46L. 5. Methods and Machinery of Business: (One Paper):—

Organisation and Working of Commercial office; Recording and filing of Correspondence—Despatching Letters—Labour Saving Equipment.

Invoicing; Care of Outward and Inward Invoices—Proforma Invoices—Debit Notes—Credit Notes—Inland Invoices—Foreign Invoices—Monthly Statements of Accounts.

Counting House Routine; Petty Cash-Opening.

Collecting, Paying and Checking of Accounts.

Trading Houses-Mercantile Agents and Markets.

Exporting and Importing.

Bills of Exchange—Promissory Notes—Cheques.

Postal and Telegraph System—Charges for Letters, Parcels and Telegrams—Writing of Telegrams and Cablegrams—Codes—General and Private.

Insurance; Marine, Fire-and Life. General Principles underlying each type of Insurance.

R. 46M. 6. Composition: (One Paper):

- (a) Additional paper in English—Exercises in composition based on books prescribed for general reading,
- (b) French or German—Translation into and from English of passages from two prescribed texts, both of a general character,

(c) Modern Indian Language—Syllabus to be the same as that for the First Year in Arts, option being given in respect of the essay to suit commerce students.

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(6).—INTERMEDIATE EXAMINATION IN COMMERCE.* (OLD RULES).

Admission.

0. 206.

No candidate will be admitted to this examination unless, after obtaining a certificate from the Principal of an Arts College affiliated to this University showing that he has satisfactorily carried out the work appointed by the University for the first two terms in Arts, he shall have kept two terms at a College or Institution recognized by this University in Commerce, and unless he produces satisfactory testimonials in the prescribed form, which shall include a certificate that the candidate has satisfactorily gone through the course of Physical Training prescribed by the Syndicate from time to time, unless exempted on the ground that he is medically unfit to undergo such exercise, or that he is a member of the University Training Corps or that he has been regularly taking part as a member of the College Team in the recognised fixtures of matches of the major games.

In order to go through a course of Physical Training satisfactorily, the student shall have attended the Physical Training class of his College for at least three-fourths of the possible number of periods.

R. 47.

Candidates will be examined in the following subjects:

I.—English.

II.—Elements of Economics.

III.—Economic Geography.

IV .- Accounting.

V.—Administration.

Syllabus.

R.

48. I.—English—One Paper—100 Marks.

> Composition, commercial words and expressions, letter-writing including elementary commercial correspondence. portance will be attached to handwriting.)

49. R.

II.—ELEMENTS OF ECONOMICS—Two Papers of 100 Marks each.

Subject matter of Economics.

Fundamental conditions of material welfare, natural resources, human energy, capital.

Influence of social customs and institutions. Relation of the size of the population to its material welfare.

Production regulated by demand. The laws of Demand and Supply. Market price. Normal price. Monopoly. Speculation.

Functions of Money. Metallic money. Paper money.

Essentials of a sound currency system.

Credit. Modern bank operations. The nature of a fully developed banking system.

^{*} The Intermediate Commerce examination under the existing Rules will be held for the last time in March 1940, and that under the New Rules will be held for the first time in March 1940.

Incomes from (a) property, (b) work. Causes of inequality of incomes and wealth.

The wealth of nations.

The economic functions of the State.

The essential principles underlying public expenditure, public income and public debt.

R. 50. III.—Economic Geography—One Paper—100 Marks.

Physical Geography as the basis of the various types of civilization, and a determining factor of national and economic development.

Chief commodities of commerce:—Agricultural and allied products, minerals and manufactures. Conditions and regions of production. Preparation for the market and chief processes. Trade.

Trade Routes by land and by sea.

Present day production and foreign trade of India, Great Britain, and the leading commercial and industrial countries of the world.

R. 51. IV.—Accounting—One Paper—100 Marks.

Keeping the subsidiary books, posting into the ledger, preparing Trading and Profit and Loss Accounts and Balance Sheets of General Merchants, Partnerships, and Joint Stock Companies. Bad Debts, Depreciation and Reserves.

R. 52. V.—Administration—One Paper—100 Marks.

- (a) A brief study of the principles underlying the Constitution of Great Britain and of the Dominions.
- (b) Indian Administration, including Indian Finance.

Standard for Passing the Examination.

- R. 53.

 To pass the examination the candidate must obtain 40 per cent. of the full marks in each subject. Should a candidate fail to obtain 40 per cent. of the full marks in one only of the following subjects:— Elements of Economics, Economic Geography, Accounting, Administration, he should be declared to have passed the examination if, on a review of his marks, a majority of not less than two-thirds of the Examiners present at the final meeting decide that he should pass. Provided always that no candidate shall so pass unless he obtains at least 50 per cent. of the total marks in all subjects. Those of the successful candidates who obtain 60 per cent. of the total marks obtainable will be placed in the First Class and those obtaining 50 per cent. in the Second Class.
- R. 54. A candidate who obtains 50 per cent. of the total marks in any subject at any one examination may be excused from appearing in that subject at a subsequent examination and will be declared to have passed the whole examination when he has passed in all the subjects

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of the examination: Provided that in the subject or subjects in which he appears on the last occasion he must obtain the minimum in each subject required by Regulation 53. Candidates passing the examination in this manner in compartments will not be eligible for a class or for any prize or scholarship to be awarded at the examination.

TRANSITORY REGULATIONS.

- 1. Two supplementary Intermediate Commerce Examinations under the old Regulations will be held, the first in October 1939, and the second in March 1940. Admission to the said supplementary examinations will be restricted to the following classes of candidates:—
 - (1) Candidates who fail to pass the Intermediate Commerce examination to be held in March 1939, or who have failed to pass the said examination in any previous year;
 - (2) Candidates registered for the Intermediate Commerce examination to be held in March 1939, or held in any previous year, but who failed to appear thereat;
 - (3) Candidates who keep the necessary terms but are not sent up for the Intermediate Commerce examination before March 1939, provided that they are subsequently certified by their Principals as fit to be sent up for one of the said supplementary examinations.
- 2. In each of the above cases the application for admission to the said supplementary examinations shall be forwarded to the Registrar through the Principal of a College.
- 3. Candidates who have been exempted under the old Regulations from the subjects of English, Economics, Accounting and Administration shall be exempted from the corresponding subjects of the Intermediate Commerce examination and from the First Year Commerce Examination under the new Regulations and shall be permitted after keeping two additional terms to appear at the Intermediate Commerce examination under the new Regulations only in the remaining subjects, namely—
 - 1. Commerce.
 - 2. Composition in English or in a Modern Indian language or a paper in French or German.

(6 A.) INTERMEDIATE COMMERCE EXAMINATION (REVISED REGULATIONS.)*

Admission.

0. 206A.

No candidate will be admitted to this Examination unless, after obtaining a certificate from the Principal of a Commerce College affiliated to this University showing that he has satisfactorily carried out the work appointed by the University for the first two terms in

[•] The Intermediate Commerce examination under the revised Rules will be held for the *first* time in March, 1940.

Commerce, he shall have kept two terms at a College or Institution recognized by this University in Commerce, and unless he produces satisfactory testimonials in the prescribed form which shall include a certificate that the candidate has satisfactorily gone through the course of Physical Training prescribed by the Syndicate from time to time, unless exempted on the ground that he is medically unfit to undergo such exercise, or that he is a member of the University Training Corps or that he has been regularly taking part as a member of the College Team in the recognized fixtures of the matches of the major games. In order to go through a course of Physical Training satisfactorily, the student shall have attended the Physical Training class of his College for at least three-fourths of the possible number of periods.

- R. 47A. Candidates will be examined in the following subjects:
 - 1. English.
 - 2. Economics.
 - 3. Accountancy.
 - 4. Commerce.
 - 5. Administration or Salesmanship and Publicity or

Mathematics.

- 6. Composition in-
 - (a) English

01

- (b) A Modern Indian Language
- (c) French
- (d) German.

Syllabus.

R. 48A. 1. English: (Two Papers):—

- (a) Prescribed text-books of Standard English Literature (to be recommended by the Board of Studies in Commerce.)
- (b) Composition including commercial correspondence and an essay.

R. 48B. 2. Economics: (One Paper):—

The subject matter of Economics and its relations to other social sciences; Market Demand and Price. The nature of production. Specialisation Capital. The organisation of Production. The working of the price—mechanisation Monoploy.

The mobility of factors of production.

Wages, Interest, Economic Rent, Profits.

The nature and functions of money. The forms of money and credit.

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The value of monetary units. Trade Cycles.

Functions of Joint-stock Banks, and Central Banks.

Causes of inequality of incomes.

Elementary notions of public expenditure, income and debt.

(N. B.—The course should be illustrated by reference to recent events and Indian conditions.)

R. 49A. 3. Accountancy: (One Paper):

Theory and practice of Single and Double Entry Book-keeping including the preparation of production, trading and profit and loss accounts and balance sheets of sole traders, partnerships and Joint Stock Companies. Treatment of Bad Debts, Depreciation and Reserves, Consignment and Joint Venture Accounts, Partnership and Company Accounts. Bank Reconciliation Statement.

R. 50A. 4. Commerce: (One Paper):—

- I. Machinery of Commerce :-
 - (a) Marketing.
 - (b) Mercantile houses,
 - (c) Insurance,—its role in Commerce,
 - (d) Shipping and Finance,
 - (e) Chambers of Commerce,
 - (f) Trade Associations,
 - (g) International Organisations for Commerce,
 - (h) Transport.
- II. Factors of Commercial Efficiency.
- III. Staples of world trade.

(N. B.—The course should be illustrated by reference to Indian conditions.)

R. 51A. 5. Administration: (One Paper):—

- (a) A brief study of the constitution of Great Britain and of the principles underlying the constitutions of the self-governing Dominions.
- (b) Indian Administration including Indian Finance

or

Salesmanship and Publicity: (One Paper):—

Salesmanship, a factor in Commerce—Psychology of selling-factors of sales process-cultivating wants and creating market-fixing of the selling price and factors.

Organisation of a sales department—sales agencies and their control—selection of salesmen—qualities necessary for

them—their training—allocation of territories—their supervision—methods of remuneration, analysis of sales and its relation to the selling cost.

Publicity—silent salesmanship—nature and purpose—modern methods of publicity—different forms of literature used—their importance and preparation—

Study of the Market—approaching customers—old and new.

Display—show rooms—sales machines—window dressing. Mail order business.

01

Mathematics: (One Paper):-

Indices; Surds; Quadratic Equations; Progressions including Squares and Cubes of natural numbers; Simple Permutations and Combinations; Logarithms; Binomial Theorem for a positive integral index; Graphs; Trigonometrical Functions of angles of any Magnitude; Compound Angle Formulae; Inverse Trigonometrical Functions.

R. 52A. 6. Composition (One Paper):—

(a) Additional Paper in English—

Exercise in Composition based on Books prescribed for general reading

01

(b) French or German-

Translation into and from English of passages from two prescribed texts, both of a general character.

01

(c) A Modern Indian Language—

Syllabus to be the same as that for the Second Year Arts, option being given in respect of the essay to suit Commerce students.

Standard for Passing the Examination.

- R. 53A. To pass the examination the candidate must obtain 40 per cent. of the full marks in each subject. Should a candidate fail to obtain 40 per cent. of the full marks in one subject only he should be declared to have passed the Examination, if on a review of his marks, a majority of not less than two-thirds of the Examiners present at the final meeting decide that he should pass: Provided always that no candidate shall so pass unless he obtains at least 50 per cent. of the total marks in all subjects. Those of the successful candidates who obtain 60 per cent. of the total marks obtainable will be placed in the First Class and those obtaining 50 per cent. in the Second Class.
- R. 54A. Same as R. 54 on Pages 216 & 217.

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(7).—EXAMINATION FOR THE DEGREE OF BACHELOR OF COMMERCE (B. Com.)

Admission.

- No candidate will be admitted to this examination unless, after passing the Intermediate Examination in Commerce at this University, or an examination of any other University considered equivalent to the Intermediate Examination in Commerce of this University, he shall have kept four terms at a College or Institution recognized by this University in Commerce, and unless he produces satisfactory testimonials in the prescribed form.
 - [N. B.—Graduates in Arts of every Statutory Indian University and the University of Mysore who have passed a degree examination with Economics as one of their subjects, and graduates in Commerce of other Statutory Indian Universities, and the University of Mysore, will be admitted to the B. Com. Degree Examination of this University after an attendance of four terms at a College recognized by this University in Commerce: Provided that graduates in Arts thus to be admitted pass in Accounting at the Intermediate Examination in Commerce of this University either before or simultaneously with the B. Com. Degree Examination.]
- O. 208. A student who has passed in all subjects but one at the Intermediate Examination in Commerce in conformity with Regulation 54 will be allowed to keep terms and appear for the B. Com. Examination after keeping four terms, but will not be declared to have passed the B. Com. Examination under any circumstances, unless he has passed in the remaining subjects of the Intermediate Examination held either in a previous, or in the same examination season.
- A candidate who is declared to have passed the examination for the Degree of Bachelor of Commerce under Regulations 63 and 64, will, on payment of a fresh fee of Rs. 50, be admitted to a subsequent examination without keeping any additional terms in any one of the subjects specified in Regulation 55 in which he has not already passed, and will, on passing in such additional subject, be awarded a certificate to that effect: Provided that no candidate will be allowed to appear thus for examination in more than two special subjects.
- R. 55. Candidates will be examined in the following subjects:—
 - I.—English.
 - II.—Business Organization.
 - III.—Mercantile and Industrial Law.
 - IV.—Trade and Statistics.
 - V.—Indian Currency and Banking.
 - VI.—Modern Economic Development.
 - VII.—One of the following special subjects:—
 - A .- Advanced Accounting and Auditing.
 - B .- Advanced Banking.

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C .- Actuarial Science.

D.—The Organization of the Indian Cotton Industry.

E.—Economics of Transport.

Syllabus.

R. 56. I.—English. { One Paper, 75 Marks. Oral Examinination, 25 Marks. } 100 Marks.

A .- Written.

- (i) Drafting of reports, minutes of meetings, short reports for the press, replies to questionnaires, short speeches, etc.
- (ii) Commercial Correspondence.
- (iii) Précis-Writing.
- B.—An oral examination which will aim at testing the general knowledge and intelligence of the candidates in addition to their ability to converse in English correctly and fluently.
- R. 57. II.—Business Organization—One Paper of 100 Marks.

The nature and constitution of business houses (Partnerships, Companies etc). The financing of businesses. Control and responsibility. Office routine. Methods of remuneration. Industrial efficiency and scientific management. Skilful advertising.

R. 58. III.—Mercantile and Industrial Law—One Paper of 100 Marks.

The Indian Law relating to Contracts, Mortgages, Joint Stock Companies; Negotiable Instruments, Charter Parties, Bills of Lading, Fire and Marine Insurance and Insolvency in Presidency Towns.

The Provisions of the Indian Stamp and Limitation Acts relating to the above.

Industrial Legislation, Indian Factory Act, Workmen's Compensation Act, Trade Union Act, etc.

R. 59. IV.—Trade and Statistics—One Paper of 100 Marks.

Trade.

Brief history of the development of India's trade with the world. The chain of intermediaries in the trade of the country. The financing of the internal and external trade.

The chief imports, and the countries of their origin.

The importance of the Indian market to those countries.

The chief exports and their destinations.

The trans-frontier trade (Persia, Afghanistan and Tibet.)

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Statistics.

Collection, Tabulation, and Presentation of Data. Averages, Dispersion, Correllation. Index numbers. A brief study of British Indian statistics—Official and Non-official.

R. 60. V.—Indian Currency and Banking. One Paper of 100 Marks.

Indian Currency.

Early history of demonetisation of gold. Fall in the value of Silver. Herschell Committee and the closing of the mints to coinage of silver on private account. Fowler Committee and its recommendations. India and the gold mint. The gold Standard Reserve, its composition and location. Chamberlain Commission and its recommendations. Currency during the War and after. Babington-Smith Committee and its report. Failure of the attempt to link rupee to 2s. Hilton-Young Commission and the Gold Bullion Standard.

Paper Currency—Note-issue of the Presidency Banks. History of Government Currency Notes till 1914. The effects of the war on the note-issue. Changes proposed by the Babington-Smith Committee. Proposal to transfer the note-issue to a new bank.

Indian Banking.

History of Banking in India. Classification of banking institutions. The Imperial Bank of India, restrictions on its business. Its relations with Government and other Banks.

The Exchange Banks and their place in the Indian Credit System.

The Indian Joint Stock Banks—their early history. The Bank failures of 1913-14. The present position. The Shroffs: their relation to the Indian Money Market. The Co-operative credit movement: Provincial Banks, District Banks, Unions and Credit Societies.

Elements of International Trade and Foreign Exchange.

General features of international trade. The theory of international values and the equation of international indebtedness. The meaning of Foreign Exchange. The sources of supply and the demand for foreign bills. The foreign exchange rates.

Mint pars of Exchange and Specie points. Gold movements.

- R. 61. VI.—Modern Economic Development—One Paper of 100 Marks.
 - A. A brief study of the modern economic development of England, Germany, the U.S. A. and Japan.
 - B. A detailed study of the modern economic development of India.

England.

Economic conditions in the pre-Industrial Revolution period—The Mercantile System—Industrial Revolution—Industrial and Commercial policy—Agricultural Revolution—commercial Revolution—Economic Imperialism—Economic Legislation of the 19th century. Trade Unionism, Socialism, and kindred movements—The Great War and its effects, Post-War economic problems.

Germany.

Germany in the beginning of the 19th century; Agriculture, Industry, Commerce and Transport—Nepoleonic reorganisation—The Zollverein—Development of Modern Transport—Progress of Agriculture and Industry—Commercial Expansion. German Colonisation—Industrial and Commercial policy—Labour Movements—the Great War and its effects.

The U.S. A.

Struggle for commercial and economic independence—the advent of the Industrial Revolution—the Westward Movement—Development of Transport—Economic aspects of the Civil War. Main features and causes of the agricultural, industrial and commercial development. Immigration policy—Recent tendencies.

Japan.

The Economic reconstruction of Japan—Industrialisation of Japan and the Policy of the State—Lines and causes of recent economic progress in the country—Economic effects of the Great War on Japan.

India.

Economic conditions at the break-up of the Mogul Empire—A century of economic disorder—Parliamentary control—Industrial decline—Policy of preference to British interests. Abolition of the Company's Trade Monopoly—Early Land Settlements in various Provinces—Development of Mechanical Transport—Industrial Revolution—Commercial Revolution—Commercial, industrial and agricultural policy of the Government—Transition in Agriculture, Land Settlements, Land Tenures, Irrigation. Co-operation, Famines, etc.—Industrial development—Labour Legislation—Rise of economic nationalism—Change in the economic policy of the Government—Fiscal Autonomy—Recent economic tendencies.

R. 62. VII.—One of the following special subjects:—Three Papers of 100 Marks each.

A.—Advanced Accounting and Auditing.

(i) The accounts of different kinds of business including Banks, Insurance Companies, Factories, Mining Companies, Railways, and Hotels, Charitable Institutions, and other non-trading concerns. Partnership accounts, including treatment of goodwill, Income and Expenditure Accounts, Branch Accounts, Cost Accounts, Bankruptcy Accounts, Departmental Accounts, Depreciation, Reserves, Sinking Funds. The Double Account System. Columnar Bookkeeping.

(ii) Auditing—The continuous and the completed audit, the detection of fraud, technical errors, etc., errors of principle, First and Subsequent Audit; verifying Cash, Securities, Stock Sheets, Wages Sheets. Special considerations in different classes of audit. Valuation of Fixed and Floating Assets. Forms of Accounts and Balance Sheets. Capital and Revenue Items, the Auditor's Certificate; the liabilities of Auditors, the conduct of investigations and the certifying of Average Profits.

B .- Advanced Banking-

- (i) Principles—
- (a) Metallic Currency.—The functions and economic significance of money. Various forms of money. Metallic currencies and coinage. The English Mint regulations and coinage Acts. Currency deterioration—its causes, measures and remedies. Legal tender; the various systems prevailing in different countries. Methods of maintaining internal equivalence of legal tender moneys. Question of monetary standard and valuation. Decimal coinage. Various proposals for international money. Method of measuring variations in the value of money. Indian currency problems.
- (b) Banking and the Money Market—The function and economic significance of Banking. The general structure and methods of English Banking. The Cheque system and the clearing House. Banking investments. The short loan fund. The money market—its fluctuations, periodic and other. The reserve and the discount rate. The regulation of note-issue, and the Bank Acts. £ 1 notes. Comparison with Foreign systems. Recent developments in English Banking. Indian Banking. General Banking Statistics. The Foreign Exchanges. Financial and commercial crises.
- (ii) Banking Law and Practice.

C.—Actuarial Science—

- (i) The Binomial and Exponential Theorems; the theory and use of logarithms, the elements of the Theory of Probabilities, the elements of the Calculus of Finite Differences including Interpolation and Summation: Elementary Differential and Integral Calculus excluding questions requiring the use of Trigonometry.
- (ii) Compound Interest and Annuities—Certain including the construction and use of Relative Tables. Valuation of

Perpetuities, Varying Annuities and Increasing Annuities. Capital Redemption Assurances.

- (iii) Life Contingencies, including Life Annuities and Assurances and the construction and use of the life Table, and monetary and other Tables based thereon; excluding questions on the compilation of Tables from Statistics, or on Graduation.
- (iv) The classification of Policies for Valuation, and the preparation of Valuation Class Books.

D.—The Organization of the Indian Cotton Industry—

Introduction.

The Botany of Cotton.

The History of cotton cultivation and the cotton trade with special reference to India.

The World's production of cotton and India's share in it.

Supply of Raw Cotton.

(1) Cotton producing areas.

(2) Organization of cotton cultivation.

(3) Commercial varieties of cotton.(4) Ginning, baling and pressing.

(5) The marketing and consumption of raw cotton.(6) The mechanism of the home and export trade.

Supply of Cotton Yarn.

(1) Condition of the spinning industry prior to the rise of the factory system, and its developments since that time.

(2) Organization of the spinning industry.(3) India's internal and external trade in yarn.

Supply of Cotton Piece-goods.

(1) Indigenous weaving in India.

(2) Introduction of factory methods and their development.
(3) Organization of (a) the manufacture of, (b) the trade in cotton goods.

(4) Legislation affecting the cotton industry.
(5) Life and labour of the cotton operatives.

Labour Question and Social Problems connected with the Cotton Industry.

E .- Economics of Transport.

Road Transport.

Economics of road construction and maintenance. Theories of fares and rates. Variations caused by types of road transport. Competition. Relation of road to railway transport. Effect of municipal ownership or Local Government financial aid.

Railway Transport.

The nature of the rail-road—capital and expenditure—Gross and net receipts—Economics of railway construction and

maintenance—Peculiar conditions in India. Growth of passenger traffic, passenger fares. The Indian passengers and the charges—Influence on the distribution of population. Freight rates and their theory. Rate making in practice. Its defects. Its bearing on Indian conditions.

Influence of production costs on rates. Classification of goods. Special rates. Discriminative charges. Various forms of control. Competition—Effect on rates and fares of State ownership, and State guarantee of interest. The situation in India, influence of railway rates on the distribution of industries.

Inland Water Transport.

Capital expenditure. State aid. Tolls rate. Economics of haulage. Local nature of influence on industry. Policy of Germany and England.

Sea Transport.

Docks and quays. Co-ordination of rail and water-terminal facilities. Port dues. The ship. Economics of marine fuel. Charter party. Bill of lading. Sea-worthiness. Freights on liners and tramps. Agreements to control competition. General navigation laws, and State regulation. Freight making in coastwise transport. Marine insurance. Average. Salvage. The ship canal. The problem before India.

Standard for Passing the Examination.

- R. 63.

 To pass the examination, the candidate must obtain 40 per cent. of the full marks in each subject. Should a candidate, however, fail to obtain 40 per cent. of the full marks in one subject only, he shall be declared to have passed the examination if, on a review of his marks, a majority of not less than two-thirds of the examiners present at the final meeting decide that he should pass: Provided always that no candidate shall so pass unless he obtains at least 50 per cent. of the total marks in all subjects. Those of the successful candidates who obtain 60 per cent. of the total marks obtainable will be placed in the First Class and those obtaining 50 per cent. in the Second Class.
- A candidate who has obtained 50 per cent. of the total marks in any subject at any one examination may, at his option, be excused from appearing in that subject at a subsequent examination and will be declared to have passed the whole examination when he has passed in all the subjects of the examination: Provided that in the subject or subjects in which he appears on the last occasion he must obtain the minimum in each subject required by Regulation 63. Candidates passing the examination in this manner in compartments will not be eligible for a class or for any prize or scholarship to be awarded at the examination.
- R. 64A. (1) Such of the candidates as have completed their course of study prescribed under the old regulations as given on pages 110 to 116 of the University Handbook for 1928-29 to the satisfaction of the

Heads of Commerce Colleges affiliated to the University, but have failed to pass the Examination until December 1931, shall be allowed to appear for the examination in corresponding subjects as indicated below at the B. Com. Examination under the new regulations without being required to put in further attendance and shall be eligible to exemption or exemptions previously earned by them in the subjects corresponding to those prescribed under the new regulations:—

Subjects for B. Com. Examination under the old regulations

Corresponding subjects for B. Com. Examination under the new regulations

Business Organization

Mercantile and Industrial Law

Special Branches of Economics

Ecomomic History Administration Special Subjects:

> Advanced Accounting and Auditing Advanced Banking The Organization of the Indian Cotton Industry Actuarial Science.

Advanced Economic Theory and History English
Business Organization
Mercantile and Industrial Law
Indian Currency and Banking
Trade and Statistics
Modern Economic Development

Special Subjects:

Advanced Accounting and
Auditing
Advanced Banking
The Organization of the
Indian Cotton Industry
Actuarial Science.
Economics of Transport

- (2) The candidates referred to in rule 1 above shall be required to pass in English prescribed for the Examination under the new regulations before they can be declared to have passed the examination.
- (3) The candidates who appeared for the Examination with Advance Economic Theory and History as their special subject prescribed under the old regulations and have not obtained exemption in that subject shall be allowed to take in its place any one of the special subjects prescribed under the new regulations.
- (4) For the purposes of rules 2 and 3 the canditates shall not be required to put in any further attendance.

(8).—EXAMINATION FOR THE DEGREE OF MASTER OF COMMERCE.

Admission.

0. 210.

No candidate shall be admitted* to the examination for the Degree of Master of Commerce unless he has passed, not less than

* Every candidate is required also to satisfy the provisions of Ordinance 74 to be eligible to be admitted to the examination.

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two academical years previously, the examination for the Degree of Bachelor of Commerce of this University.

R. 65.

(a) The examination for the Degree will comprise two parts:—
Part I—A thesis on a problem relating to Indian Commerce,
Industries, Finance, or Transport.

Part II—A written examination in four selected subjects.

- (b) The Board of Studies may, on the recommendation of the Examiners, exempt a candidate from the whole or a part of the written examination if the thesis submitted by him is of sufficiently high merit.
- R. 66.

 No candidate shall be admitted to Part II until his thesis has been accepted and approved as qualifying under Part I of the examination. This thesis shall be received six months before the date fixed for the examination in Part II. The candidate may take Part II in the same or in a succeeding year. If the thesis is accepted, he may, unless exempted altogether under Regulation 65 (b), appear again and again in Part II until he is declared to have passed on paying a new fee in every examination after the first.

PART I .- THE THESIS.

- (a) Every candidate for the M. Com. Degree shall submit along with his application three printed or typewritten copies of a thesis on some problem concerning Indian Commerce, Finance, or Transport or Actuarial Science or any other allied subject approved by the Board and shall in footnotes or a preface quote precise references to published works or reports on which he has relied for his facts and figures. He may also submit three printed or typewritten copies of any publications of his on commercial or financial problems.
 - (b) If the thesis and publications, if any, submitted by the candidate are considered by the Board of Studies on the recommendation of the Examiners, to be of sufficient merit, the Board shall declare such candidate to have passed in Part I of the examination.

PART II .- WRITTEN EXAMINATION.

- R. 68. The written examination shall comprise four papers of three hours each. The candidates may offer any four of the following six subjects on each of which one paper will be set:—
 - I.—Economics of Agriculture with special reference to India.
 - II.—The Organization of Industries in India.
 - III.—Corporation Finance.
 - IV.—The Organization of Markets.
 - ·V.—Foreign Exchanges.
 - VI.—International Banking.

Syllabus.

- **Q. 69.** I.—Economics of Agriculture with special reference to India.
 - (1) Rural Organization:—A Historical sketch. Leading features of village life in India at present.

- (2) Organization of agriculture and the scope of co-operation therein:—
 - (a) Irrigation and dry farming, manuring and rotation of crops. Implements, Live stock.
 - (b) Fragmentation of Holdings.
 - (c) Credit and Indebtedness.
 - (d) Marketing.
 - (3) Land Tenures and Assessment.
 - (4) Agricultural Education, Research, Demonstration and Propaganda.
 - (5) Local Boards:—Education, Sanitation and Public Health, Roads.
 - (6) Problems connected with pasture lands and forests.
 - (7) Subsidiary occupations for agriculturist.

R. 70. II.—The Organization of the Leading Industries of India.

- (1) The basis of modern industry. Resources—natural and human. Capital.
- (2) Organization of important industries, e. g., Cotton, Jute, Coal, Iron, Sugar, Tea and Leather.
- (3) The present organization of arts and crafts and the means of strengthening the same.
 - (4) Labour Organization.
 - (5) State in relation to industry.

R. 71.

III .- Corporation Finance.

The financial needs of modern industries. Need for special organizations. Company promoters. Industrial Banks and Investment Trusts. Underwriting and marketing of industrial securities. Supply of short period capital. Stabilisation of profits and creation of reserves. Integration of businesses and trust finance.

R. 72.

IV .- The Organization of Markets.

- (1) Leading features of modern marketing organization.
 - (a) A detailed study of— Bullion Markets;
 Stock Exchanges;
 Produce Exchanges;
 Yarn Exchanges.
 - (b) Various kinds of transactions— Spot; Futures; Call.
 - (c) Middlemen and their functions.

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- (d) Functions of—
 Commission agents,
 jobbers,
 brokers,
 wholesale dealers,
 retail dealers.
- (2) Co-operative marketing.
- (3) Speculation: its economic functions and evils.
- (4) The control of speculation by market rules and statutes.
- (5) Trade Commissioners.
- (6) Commercial Organizations and Chambers of Commerce.

R. 73.

V .- Foreign Exchanges.

- (1) Importance of foreign exchanges in modern economic development. Regulation of exchange rates. Fundamental causes of exchange movements, the purchasing power parity.
- (2) Dealings in bills of various kinds. Investment in exchange. Borrowing by means of exchange. Speculation in exchange.
 - (3) Arbitrage. Specie shipments.

R. 74.

VI.—International Banking.

- (1) Monetary systems of the leading countries.
- (2) Comparative study of the organization of the Central and other banks of India, England, United States of America, Germany, France, Italy, Japan, Canada and Australia.
- (3) Important international money markets and their distinctive features.

R. 75.

Standard for Passing the Examination.

No candidate shall be declared to have passed in Part II of the examination unless he has obtained thirty per cent. of the full marks in each of the four papers and forty per cent. of the total marks obtainable.

ORDINANCES 211 and 212 have been deleted.

(9)—BACHELOR OF TEACHING.

Admission.

- A candidate for the Degree of Bachelor of Teaching must be a graduate of the University of Bombay or of a University recognized by the University of Bombay, in any Faculty, and in addition, must after graduation, have—
 - (i) kept two terms (the first and the second) of lectures on the Theory and Practice of Education in a Training College

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affiliated to this University for the purposes of the B. T. Degree, and

- (ii) completed a course of practical work, extending over two school terms to the satisfaction of the Head of the Institution in which the candidate is studying, consisting of
 - attendance at Demonstration and Discussion Lessons;

(b) observation of Teaching as directed;

- (c) teaching Practice of not less than 30 lessons in a recognized School;
 - Note:-Names of Schools selected as practising schools shall be every year communicated to the Syndicate by the Principal of the College.

(d) attendance at Tutorials for the discussion of Practical Teaching; and

(e) practical experience of Educational Psychology and Experimental Education.

The examination for the Degree of B. T. shall be—

Part I.—Written Examination. Part II.—Practical Examination.

- 0. 214. The examination for Part I may be taken after two terms' attendance at a Training College as required in Ordinance 213 (i). Candidates will not be permitted to appear for Part II unless they produce a satisfactory certificate that they have served for 100 working days before the 31st day of January on the staff of a school or schools recognized or approved* by the Syndicate prior or subsequent to passing the Part I.
- 0. 215. A candidate for the Examination in Part I, in Part II or in both must apply to the Registrar by January 15th in each year, with the certificate required by Ordinance 213 (i) through the head of the institution in which he has received training.

PART I.

†R. **76.** I.—In Part I candidates will be examined in the following subjects-

The Principles of Education (one Paper of 100 Marks)-

Philosophical.

Psychological—Educational Psychology.

*All Schools teaching the first five A. V. Standards (or the corresponding standards of the English teaching and European schools) and recognized by the Educational Department, Bombay, the primary training institutions recognized by the Educational Department of the Government of Bombay, and the Practising School attached to the Secondary Teacher's Training College, Baroda, are approved by the Syndicate for the purposes of Ordinance 214. In addition to these, the following schools which are neither recognized high schools, nor school

teaching the first five A. V. standards are also approved by the Syndicate:

A. V. Girls' Middle Schools, of Thana, Nasik, Ahmednagar, Bijapur, Dharwar the New English School, Ratnagiri, the Training College for Women, Hyderabad (Sind) N. J. Wadia Schools, Bombay, and the Kanyashala, Wai.

†The first examination under the amended regulation will the held in 1939.

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- (c) Ethical.
- (d) Social.

II.—The History of Education (one paper of 100 Marks).

- (i) History of Education in India during the British Period
- (ii) History of Education in India during the pre-British Period from the earliest times
- (ii) Education in England since 1800.

III.—The Practice of Education (one Paper of 100 Marks.)

- (a) School Management and Hygiene.
- (b) General Methods and Class Management.

IV .- Special Methods (one Paper of 100 Marks.)

- 1. Method in any two of the following :-
 - (i) Method in English.
 - (ii) Method in History.
 - (iii) Method in Geography.
 - (iv) Method in Classical Languages.
 - (v) Method in Modern Languages (Indian or European).
 - (vi) Method in Mathematics.
 - (vii) Method in Science.

V.—Educational Experiment (one Paper of 100 Marks.)

- (a) Recent developments in Educational Practice.
- (b) Tests of Educable Capacity. Elementary treatment only.

R. 77. The papers set for examination shall be :-

Paper I.—The Principles of Education. (200 Marks). Paper II.—History of Education. Paper III.—The Practice of Education— General Methods, Management and General School Hygiene. Paper IV .- The Practice of Education-Special Methods. Paper V.—Educational Experiment— Recent Developments in (100 Marks). Educational Practice and Tests of Educable capacity.

Standard for Passing the Examination.

R. 78. The total number of marks for the Part I Examination will be 500.

R. 79. To pass the whole examination, a candidate must satisfy the examiners in Parts I and II and obtain not less than 40 per cent. of the total marks in each.

PART. II *

- R. 80. In Part II of the examination candidates will be tested in their practical skill in class management and class teaching. Candidates will be required to keep—
 - (1) A 'Diary' of demonstrations attended, lessons observed and teaching practice carried out.
 - (2) A 'Journal' containing notes of lessons given and criticisms made thereon by a Master of Method.
 - (3) A 'Log-book' of experimental work carried out.

The Head of the Institution in which the candidate is studying will be required to keep a record and estimate of all lessons given by students in Practising Schools and of all experimental work done.

Standard for Passing the Examination.

- R. 81. The total number of marks for the Part II Examination will be 500.
- R. 82.

 (1) For practical work done by a candidate during his year's training marks up to a maximum of 250 (i. e. half the marks allotted for Part II) shall be assigned by the Head of the affiliated college in which he has been studying. Marks so assigned may be revised in the case of candidates, who fail to pass the University Examination and apply for such revision, provided (a) that they put in regular attendance for a period of one month at least at the college from which they appear for the University Examination, (b) that during this period they give under the supervision of the college authorities six additional lessons in teaching practice to the satisfaction of the Head of the Institution, and (c) that before re-appearing for the University Examination they carry out a term's work at a school recognized by the University for the purpose of Part II of the B. T. Examination. Such candidates shall not re-appear at the next immediate Supplementary Examination for B.T. (Part II.)

Note.—Marks awarded by the College authorities, original or revised, shall be submitted to the examiners through the Registrar after the practical test of all candidates has been completed, and shall be shown in a separate column in the final result sheet.

^{*(1)} The schools other than those recognized by the University are approved by the Syndicate for the purposes of Part II of the B. T. Examination, provided that such schools maintain at least 5 standards and are reconized by the Educational Department of the Government of Bombay.

⁽²⁾ In the case of schools that are not recognized by the Educational Department or that have less than 5 standards, applications for their recognition for the purpose of Part II of the B.T. Examination will be considered individually on their own merits.

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- (2) For the remaining marks a candidate must submit to a practical test of two full period lessons. The subjects of these lessons will be the two selected by the candidate under Part I, Regulation 76 (IV).
- R. 82A. To pass the Examination in either Part I or Part II, a candidate must obtain not less than 40 per cent. of the total number of marks for the said Part.
- R. 83. Such candidates who appear for Parts I and II at the same time and show exceptional merit may, on the recommendation of the two-thirds of the examiners be declared to have passed the examination with distinction.
- R. A deficiency of one mark in either Part shall be condoned for every 1 per cent. by which the total marks gained by a candidate in the whole examination is in excess of 40 per cent. of the total marks possible.
- R. 83B.

 (Transitory)

 Notwithstanding anything contained in the Regulations relating to the B. T. Examination, the old Regulations which were in force immediately before the present Regulations came into effect, shall be deemed to apply to all those candidates who appeared for the B. T. Examination before February 1936 and passed in the First, Second or Third Division or the First, Second or Third Group as the case may be.

(10).—EXAMINATION FOR THE DEGREE OF MASTER OF EDUCATION.

- Every candidate for the degree of Master of Education must be a Bachelor of Teaching of this University, or hold an equivalent degree of a recognised University, and, unless specially exempted by the Syndicate, must have been engaged in research in connection with the history, theory, practice or administration of Education, for a period of at least two years, under the guidance of a teacher recognised by the University for the purpose of this degree.
- 0. 215B. Two months before submitting the thesis the candidate shall forward to the Registrar, through a recognised teacher, a statement giving the title and a synopsis of the thesis, along with a fee of Rs. 75.
- 0. 215C. No further fee shall be charged to a candidate who re-submits his thesis for examination after due revision, under R. 83 I.
- R. 83C. The Examination for the degree of M. Ed. shall be by thesis only.
- R. 83D. The candidate may submit his thesis at any time during the year, subject to the provisions of O. 215A and O. 215B.
- R. 83E. The candidate shall submit his thesis in triplicate with at least one set of diagrams (if any).
- R. 83F. The thesis shall be the candidate's own work carried out under the guidance or supervision of a recognised teacher and shall be either (i) a critical analysis of existing data, or (ii) a record of original

investigation, or (iii) a combination of these, and shall be accompanied by a certificate signed by the teacher under whose guidance he has been working, stating that the thesis is worthy of examination.

- R. 836. The Board of Studies in Teaching shall recommend to the Academic Council the name of one referee (who shall not be the teacher under whose guidance the candidate has been working) to whom the thesis shall be submitted and who shall, after consulting the teacher who has been guiding the candidate, report to the University whether the thesis shall be accepted or rejected. The Report of such referee shall be final. Every such report shall be circulated to the members of the Board of Studies in Teaching and placed before the Academic Council for information.
- R. 83H. If the referee recommends that the thesis be accepted, the candidate shall be declared to have qualified for the degree of M. Ed.
- R. 831. A thesis which has been rejected may be re-submitted after due revision, subject to O. 215B, O. 215C and R. 83E and R. 83F.

(11).—EXAMINATION FOR THE DEGREE OF Ph. D.

- 0. 215D. The Degree of Doctor of Philosophy may, subject to the conditions mentioned below, be conferred upon:—
 - (a) Graduates in the Faculties of Arts or Science or Technology of this University or of any other University recognised by this University, and Graduates in Medicine and Surgery of this University or of any other University recognized by this University who have carried on research in Anatomy, Bacteriology, Pathology, Pharmacology, or Physiology.
 - (b) Masters in the Faculties of Arts or Science or Technology of this University or of any other University recognized by this University.
- A candidate for the degree of Ph.D., must have worked for the necessary period under the guidance of a University Teacher. For Bachelors in the Faculties of Arts, Science, Medicine, Agriculture or Engineering, this period shall be three academic or calendar years for Bachelor of Science (Tech.), two academic or calendar years and for Masters in Arts, Science or Technology one academic or calendar year, if the Master's degree has been obtained wholly by research or two academic or calendar years if wholly or partly obtained by papers in the same subject or wholly by research in another subject. The term 'academic year' applies to candidates who register within one calendar month of the first day of any academic year and that of 'calendar year' to candidates who register at any other time. Admission to the qualifying degree shall be a condition precedent.
- (i) A candidate for the Ph. D. degree in Mathematics, Physics, Chemistry, Botany, Zoology, Geology, Anatomy, Bacteriology, Pathology, Pharmacology or Physiology shall first pass the Language Test

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prescribed for the M. Sc. Examination by research in that subject at least two years prior to presenting his thesis for the Ph. D.

- (ii) The Language Examination Paper in French or German shall be of two hours' duration, and shall consist of a passage or passages for translation into English. The passage or passages shall be relating to the particular branch of Science offered by the candidate. The use of a dictionary shall be allowed in answering the paper.
- 0. 215G. Deleted.
- No candidate shall be permitted to appear for the Ph.D. degree in a Faculty different from the one in which he has obtained his Bachelor's or Master's degree, provided, however that a graduate in the Faculty of Medicine shall be permitted to appear for the Ph. D. degree in the subjects of (i) Animal Physiology and (ii) Microbiology.
- O. 215 I.

 No candidate shall be registered for a master's degree and Ph. D. simultaneously provided always that a candidate who is registered for a Master's degree may be permitted on the recommendation of the University Teacher guiding his studies, to submit a thesis for the Ph.D. degree not less than three academic or calendar years from the date of his registration for the Master's degree in the case of Bachelors in the Faculties of Arts, Science, Medicine, Agriculture or Engineering and in the case of Bachelors of Science (Tech.), not less than two academic or calendar years from such registration. Such candidates shall pay the difference between the registration fee for the Ph. D. degree and that for the Master's degree.
- A candidate will not be permitted to submit as his thesis a thesis for which a degree has been conferred on him in this or in any other University; but a candidate shall not be precluded from incorporating work which he has already submitted for a degree in this or in any other University in a thesis covering a wider field, provided that he shall indicate in a written statement accompanying the thesis any work which has been so incorporated.
- 0. 215K. Each candidate for the degree shall send three type-written or printed copies of his thesis embodying the results of his research and stating whether the work is based on the discovery of new facts by the candidate or of new relations of facts observed by others, and how the work tends to the general advancement of knowledge. The candidate shall further forward a statement indicating the sources from which his information has been derived and the extent to which he has based his work on the work of others, and shall indicate which portion or portions of his thesis he claims as original. Where a candidate presents a joint work, he shall clearly state the portion which is his own contribution as distinguished from the portion contributed by his collaborator. This statement shall be certified as correct by the University Teacher, as well as the candidate. The candidate may also forward with his application three copies of any original contribution or contributions to the advancement of knowledge on the subject selected by him for his thesis or any cognate subject published by him independently or jointly with others upon which he relies in support of his

candidature. The thesis shall be written or printed in English, save that when the subject-matter of the thesis relates to a Modern European or Modern Indian Language, it may, with the previous permission of the Board of Postgraduate Studies, be written or printed in that language.

N. B.:—For the purpose of the above Ordinance, "Modern Indian Language" shall include Marathi, Gujarati, Kannada, Urdu and Sindhi, and "Modern European Language" shall

include German, French and Portuguese."

- O. 215L. Two months before submitting the thesis the candidate shall forward to the Registrar through his University Professor or University Teacher, a statement giving the title and a synopsis of the thesis along with a fee of Rs. 100. Thesis may be submitted any time during the year.
- O. 215M. The thesis and publications if any, forwarded by the candidate, shall be referred by the Syndicate on the recommendation of the Academic Council and the relevant Board of Studies, to one referee who shall report on the work submitted for the degree, such referee not being a person from whom the candidate has received guidance. He shall, before reporting on the thesis, consult the University Teacher under whom the candidate has received guidance.
- O. 215N. The report of the referee shall be final. If the referee states that in his opinion, the thesis is worthy of the degree, the degree of Ph. D., shall be conferred on the candidate.
- 0. 2150. The degree of Ph. D. shall not be conferred as an ad eundem degree.
- 0. 215P. A work that has been rejected may be re-submitted after due revision and subject to the payment of half the original fee.
- O. 2150. Save in the case of candidates for the Ph. D. Degree in Medicine presenting thesis in the subjects of Bacteriology, Pathology and Pharmacology, the lower Master's Degree may be conferred on a candidate for the Ph. D. degree in the faculties of Arts, Science or Technology, whose work, in the opinion of the referee, is not worthy of the degree of Ph. D., but is of a sufficient degree of merit to justify the award of such lower Master's Degree provided the candidate does not already hold a Master's degree.

Nothing in this Ordinance shall be deemed to permit a candidate who has been registered for the Ph. D. degree to submit a thesis for the lower Master's degree.

(12)—DEGREE OF DOCTOR OF LETTERS (D. Litt.)

- O. 215R. The degree of Doctor of Letters may be conferred upon graduates in Arts of this University for published work which has been undertaken mainly on the candidate's own initiative, which may be deemed by competent judges to be valuable contributions to learning.
- 0. 215S. A candidate for this degree must have at least three years' standing as a Master or seven years' standing as a Bachelor.

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- O. 215T. A candidate for this degree may apply to the Registrar at any time in the year to be admitted to the degree. The application shall be accompanied by four copies of the published work on the merits of which the degree is sought.
- R. 83J. The candidate shall also submit a signed statement showing in what particulars his work advances knowledge on the subject of his research and indicating the nature and extent of any guidance or advice that he may have received from any one during the progress of his research. The candidate may support his application by giving proof of having done other original work.
- 0. 215U. A candidate shall pay a fee of Rs. 200 at the time of making his application.
- 0. 215V. The Registrar shall place all the papers and documents mentioned in Ordinance 215T and Regulation 83J before the relevant Board or Boards of Studies which, after due consideration, shall suggest to the Academic Council the names of three referees.
- O. 215W. The referees shall make a joint report to the Registrar for submission to the Academic Council stating whether they consider the work to be a valuable contribution to learning and deserving of the degree. The Academic Council shall then send its recommendation thereon to the Syndicate.
- 0. 215X. The degree of D. Litt. shall not be conferred as an ad eundem degree.
- 0. 215Y. A work that has been rejected may be re-submitted after due revision and subject to the provisions of Ordinances 215T and 215U.

BACHELOR OF SCIENCE.

GENERAL.

O. 216. Candidates for the Degree of Bachelor of Science must have passed the Matriculation Examination, and will be required to pass two subsequent examinations, the first to be called the Intermediate Examination in Science and the second, Examination for the Degree of Bachelor of Science.

[N. B.—A Bachelor of Arts who has taken either of the Optional Science groups shall be allowed to appear in any Science group in the B.Sc. Examination provided he has kept four terms at a College or Institution recognized in Science, subsequent to his passing the B.A. Examination. Further, a Bachelor of Arts shall be allowed to appear for the B.Sc. Examination in the optional group in which he has passed the B.A. Examination (i. e., either Physics and Chemistry or Botany and Zoology) after he has kept, subsequent to his passing the B.A. Examination, two terms at a College or Institution recognized in Science.]

(13).—FIRST YEAR EXAMINATION IN SCIENCE.

O. 216A. During the first year, there is no University examination for a candidate proceeding to a degree in Science. Such a candidate will be permitted at the end of the first year to enter on a course for the Intermediate Examination in Science or the First Year Examination in Science (Agri.); Provided that he produces a certificate from the Principal of a College affiliated for the teaching of Science showing that he has satisfactorily carried out the work appointed by the University for the first two terms in Science and has further satisfactorily gone through the course of Physical Training prescribed by the Syndicate, from time to time, unless exempted on the ground that he is medically unfit to undergo such exercise, or that he is a member of the University Training Corps or that he has been regularly taking part as a member of the College Team in the recognised fixtures of matches of the major games.

In order to go through a course of Physical Training satisfactorily the student shall have attended the Physical Training class of his College for at least three-fourths of the possible number of periods.

- O. 216B. Heads of Colleges are empowered to charge for each candidate who applies to be examined a fee of not more than Rs. 10. The Head of each College shall also collect and forward to the Registrar of the University a fee of Rs. 10 for each candidate who has been certified and shall submit the names of all candidates who have been certified in accordance with the above Ordinance (Ordinance 216A) and the names of such candidates shall be registered by the University.
- R. 83K. The following are the subjects appointed by the University for the first two terms in Science:—
 - 1. English.
 - 2. (a) Composition in English or in Modern Indian Language;

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- (b) A paper in French or German.
- 3. Physics.
- 4. Chemistry.
- 5. Biology.
- 6. Mathematics.

Syllabus.

R. 83L. I.—ENGLISH—(Two Papers of three hours each, carrying 100 marks each.)

There shall be two papers of three hours each, one in prose, and the other in poetry carrying 100 marks each. The paper in poetry shall be on prescribed texts. The paper in prose shall also be on prescribed texts, and shall include an essay based thereon, carrying 25 marks.

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R. 83M.

2. Composition in English or in a Modern Indian Language* or a paper in French or German.

(One Paper of three hours carrying 100 Marks.)

(a) Composition in English or in a Modern Indian Language.

Books will be prescribed.

The paper shall contain exercises in Composition based on books prescribed for general reading and shall test the candidate's ability to express himself correctly and idiomatically in the language on the subject-matter of the books prescribed. The paper in the Modern Indian Language shall also contain an essay which has no bearing on the prescribed texts. The essay will be on a scientific subject.

(b) A paper in French or German. Books will be prescribed.

The paper shall include passages in French or German for translation into English, but shall not include passages in English for translatation into French or German. These passages shall be taken from the two prescribed texts, one of a general character and the other on a scientific subject.

R. 83N.

3. PHYSICS (including practical).

(One Paper of three hours and a practical examination of not less than three hours, both together carrying 150 Marks).

There shall be one paper of three hours and a practical examination extending over not less than three hours on the course prescribed below:—

 $\it Course\ Prescribed:$ Statics, dynamics; properties of matter, heat, light, magnetism and electrostatics.

Details.

(i) Paper.

Statics and Dynamics.

Fundamental and derived units, dimensions, units of l, m and t Vernier, micro-meter screw, cathetometer, measurement of length, surface and volume.

Matter, material particle. Vectors and scalars. Velocity, acceleration. Composition and resolution of scalars and vectors.

Laws of motion, force, composition and resolution of forces acting at a point, moment of a force, parallel forces, couples, centre of gravity. Equilibrium of forces; stable, unstable and neutral equilibrium. Work, power, kinetic and potential energy, conservation of energy. Simple machines, pulleys, inclined plane, screw, balance. Statical friction, measurement of its magnitude.

The Modern Indian Languages shall mean and include the following:—
(1) Marathi. (2) Gujarati. (3) Urdu. (4) Kannada. (5) Sindhi. (6) Hindi.

Motion in a circle, hodograph, periodic motion, simple harmonic motion, velocity acceleration of a S. H. M. graphical representation, composition of S. H. M.'s laws of oscillation of simple pendulum, pendulum as a measure of time.

Properties of Matter:

General properties and states of matter, density, pressure, exerted by a fluid, principle of Archimedes, elasticity of gases, equilibrium of a liquid at rest, manometer, barometer, air-pump for suction and compression, syphon, hydraulic press, surface tension phenomena, properties of solids, malleability, ductility, hardness, porosity, elasticity, elongation, Hooke's law, Young's modulus.

Heat:

Temperature, thermometers and thermometric scales, errors in mercury thermometers. Linear expansion and its coefficient; cubical expansion and its co-efficient for solids, liquids and gases. Change of density with temperature, expansion of a gas at constant pressure, increase of pressure of a gas at constant volume, gas laws, absolute zero.

The nature of heat. Quantity of heat, specific heat and its measurement, transference of heat, condition of heat, convection of heat, measurement of thermal conductivity (elementary methods).

Change of state; melting point, boiling point and their determinations. Change of volume during change of state, latent heat. Vapour pressure, saturated and unsaturated vapours. Humidity, hygrometry.

Light:

The nature of light. Propagation of light, intensity of light, law of inverse square, illuminating power, photometry.

Ray of light, shadows. Pin-hole camera, laws of reflection, use of mirror and scale, reflection in spherical mirrors, images of small objects on the axis of a mirror, laws of refraction, images of a point formed by refraction through a plane parallel plate and a prism, total internal reflection, refractive index and its determination, minimum deviation, dispersion, lenses, relative positions and sizes of image and object.

Simple microscope, telescope, spectroscope.

The eye, defects of vision.

Magnetism and Electrostatics:

Magnetic attraction and repulsion; natural, artificial, temporary and permanent magnets. Magnetic field of force, molecular magnets, Coulomb's law the unit magnetic pole, magnetic moment, couple acting on one magnet in the field of another magnet.

The magnetic elements and their measurements, terrestrial magnetism, measurement of the horizontal component of the earth's

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magnetic field, magnetic records, magnetic changes and their interpertation, magnetic storms.

Electrostatics. Electrification by friction and by induction, conductors and non-conductors, Coulomb's law, positive and negative electrification.

Electrical lines of force, potential, equipotential surfaces, electrical field due to a simple charged conductor, field inside a hollow charged conductor.

Specific inductive capacity. Capacity of a conductor, condenser.

The friction machine, the elector-phorus, the water dropper, the Wimshurst's machine.

(ii) Practical Work.

Every candidate shall complete a course of laboratory work of not less than 20 experiments as detailed by the Academic Council on the recommendation of the Board of Studies. Every candidate must record his observations directly in his laboratory journal and write therein a report of each exercise performed along with a diagrammatic sketch of the apparatus used. Every exercise is to be signed by a member of the laboratory staff and the journal is to be certified at the end of the year by the Head of the Department.

The exact exercises are not given below. They are left to the discretion of the individual colleges. The following indicates the scope of the work with which the student must be familiar. All the items given below must be covered. It is therefore not necessary to mention that either this or that exercise is compulsory. A student who presents himself for a practical examination of the F. Y. Physics must be familiar with at least all the fundamental operations detailed below:—

- 1. Use of logarithms.
- 2. Use of vernler calipers.
- 3. Use of micrometer screw and spherometer.
- 4. Use of the balance, method of oscillations.
- 5. Measurement of the density of a solid and a liquid.
- 6. Measurement of the oscillations of a simple pendulum and the determination of the value of 'g':
- 7. Use of the method of pins for the paths of rays and of the method of parallax to study the properties of a—
 - -concave mirror (r, f)
 - —convex mirror (r, f)
 - -plane parallel plate (deviation, refractive index)
 - -prism (angle of prism, minimum deviation, refractive index)
 - —convex lens (r, f, refractive index, magnification)
 —concave lens (r, f, refractive index, magnification)
- 8. Use of a photometer.
- 9. Use of a thermometer, determination of its fixed points and errors.

- 10. Measurement of the coefficient of linear expansion.
- 11. Measurement of the coefficient of cubical expansion.
- 12. Measurement of the quantity of heat as required in the determination of the—specific heat.
- 13. —latent heat of fusion.
- 14. —latent heat of evaporation.
- 15. Plotting the magnetic lines of force.
- 16. Measurement of the periods of suspended magnets.
- 17. Measurements of the dip.
- 18. Use of an electroscope.

R. 83 0.

4. CHEMISTRY (including practical).

One Paper of three hours and a practical examination of not less than three hours, both together carrying 150 Marks.

There shall be one paper of three hours and a practical examination extending over not less than three hours on the course prescribed below:—

Inorganic Chemistry.

The character of physical and chemical changes including solution, distillation, crystallization, dissociation, combustion, precipitation, neutralization, electrolysis, the conditions which influence and determine them and the attendant phenomena-Catalysis.

Acids and bases.

Oxides, their formation and classification.

The formation and decomposition of salts.

Oxidation and reduction.

The general laws of gases. Avogadro's hypothesis. Molecular weights. Experimental determination of the density of gases and of vapours. Atomic hypothesis. Experimental determination of atomic weights. Symbols, formulæ, equations and chemical calculations. The simple gas equation.

Gas mixtures. Diffusion.

The atmosphere.

Oxygen; preparation and properties.

Hydrogen; preparation and properties.

Water; water of crystallization, efflorescence, deliquescence.

Carbon; varieties of carbon; carbon dioxide and the carbonates.

Nitrogen; ammonia; nitric oxide, nitric acid and the nitrates.

Chlorine; hydrochloric acid and the chlorides, the action of chlorine on alkaline solutions.

Sulphur; sulphur dioxide and sulphur trioxide; sulphuric acid and the sulphates, sulphuretted hydrogen and the sulphides.

Mercury and its compounds including mercuric sulphate, chloride, nitrate, oxide, hydroxide, sulphide; mercurous nitrate, chloride.

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Aluminium and its compounds including aluminium sulphate and the alums, aluminium oxide, hydroxide, sodium aluminate; the action of aluminium on certain metallic oxides (Goldschmidt's process.)

Tin and its compounds including stannic chloride, sulphide, oxide; stannic and metastannic: acids: stannous chloride, sulphide.

The rusting of tin plate and of galvanized iron.

Iron; cast iron, steel and wrought iron; oxides of iron; ferric chloride, hydroxide; ferrous sulphate, chloride, hydroxide.

Magnesium; magnesium sulphate; oxide and carbonate.

Calcium and its compounds; calcium sulphate, phosphate, chloride, hydroxide, oxide, carbonate and carbide.

Sodium and the compounds; sodium chloride, sulphate, sulphide, carbonates, hydroxide, nitrate.

Practical Examination.

Each candidate must obtain a certificate from the Head of the Chemistry Department of his college that he has completed in a satisfactory manner a practical course on the lines laid down from time to time by the Academic Council on the recommendation of the Board of Studies and that his laboratory journal has been properly kept. Every candidate must have recorded his observation directly in his laboratory journal and written therein a report on each exercise performed. Every journal is to be signed periodically by a member of the laboratory staff. Candidates are to produce their laboratory journals at the practical examination. Each candidate is required to have performed satisfactorily some portion at least of each of the exercises and to be prepared to satisfy any tests within the standard and scope of the syllabus prescribed. Experiments and observations should be made quantitative, as far as possible, and some knowledge be obtained as to the extent or the error incidental to each.

Course of Practical Work at present prescribed.

PART I.

- 1. The cutting and bending of glass tubing. The preparation of simple apparatus involving the use of corks and tubes, e. g., gas generating tubes and flasks, wash bottles.
- 2. Determination of the change in weight on heating a known weight of magnesium or other substance in air.
- 3. Decomposition of salts on heating; the qualitative and quantitative results of heating such substances as lead nitrate, magnesium carbonate, zinc carbonate, sodium hydrogen carbonate, potassium chlorate, hydrated barium chloride and ammonium chloride.
- 4. The preparation on a small scale of oxygen, hydrogen, carbon, dioxide, chlorine; properties of these gases.

[Part II

- 5. The effect of heating metallic oxides with carbon.
- 6. The use of standard and normal solutions as in simple acidimetry and alkalimetry determination.

PART II.

- 7. Neutralization and salt formation; preparation of salt in the crystalline state, such as sodium chloride, potassium sulphate, potassium nitrate, lead nitrate from litharge, zinc sulphate from zinc, magnesium sulphate from magnesium carbonate and other salts obtained by similar methods.
- 8. Candidates will be expected to detect the presence of any of the following elements and radicals:—hydrogen, sodium, calcium, aluminium, mercury, tin, in the form of oxide, hydroxide, sulphate, carbonate, chloride, nitrate in powders soluble in water or hydrochloric acid or solutions containing not more than one base and one acid in each. Both dry and wet methods should be used and confirmatory tests should be made.
- N. B.—Candidates must not be allowed to use their laboratory note books during the practical examination.

R. 83P.

5. Biology—(One Paper of two hours, carrying 100 Marks).

There shall be one Paper of two hours, carrying 100 Marks based on the following syllabus:—

I.—General.

Living bodies as opposed to non-living. Origin of Life. Protoplasm and its properties. Division of living organisms into plants, animals.

Scope and aim of the Science of Biology and its main subdivisions.

Cellular structure of plants and animals. Tissues, organs and systems.

Perpetuation and variation of species. Adaptation, Heredity, Mendelism, Organic Evolution.

II.—Plants.

Different parts of the flowering plants. The Structure of roots, stems, leaves and their functions.

Flowers and their functions. Relation between flowers and insects.

Reproduction in plants; (a) Vegetative, (b) asexual, (c) sexual.

Plants and diseases. Bacteria, Mildew, Rust and Scrab.

Plants as food producers. Their importance to man and other animals.

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Relations of plants with their environment. Plants in relation to soil. Plants in relation to climate. Plants in relation to other plants, animals and man.

Some life processes of plant. Food of Plants, Digestion, Respiration, Growth. Effect of light and gravity on the growth of plants.

Practical applications of the science of Botany.

III. - Animals.

General Survey of the different forms of Animal Life.

Nutrition: Organs of nutrition, and growth.

Circulation: Organs of circulation, and circulating fluids.

Respiration and organs of respiration.

Excretion and organs of excretion.

Regulation of heat.

Reproduction: Its different modes and the organs.

Development: Different modes of development and larva stages.

Nervous System: Different types of nervous systems and their functions.

Phonation and the organs of senses.

Locomotion: Modes and organs of locomotion.

Habits of animals and parental care.

Animals in relation to man: Animals injurious to man, e. g., housefly, mosquito, round-worms, snakes; animals helpful to man e. g., bees, silk-worm, domestic animals, etc.

Note: The lectures should be illustrated by dissected specimens, lantern slides, wall-pictures, diagrams etc., with special reference to rabbit.

R. 83Q. 6. MATHEMATICS.—(Two Papers of three hours each carrying 100 Marks each).

There shall be two papers, one on Algebra and the other on Geometry and Trigonometry, or in the alternative two papers on Descriptive Mathematics, based on the syllabus prescribed. The Syllabus prescribed is the same as the syllabus laid down for the First Year Course in Arts (Vide R. 9 ante).

14.—INTERMEDIATE EXAMINATION IN SCIENCE (OLD RULES.)*

Admission.

0. 217. No candidate will be admitted to this examination, unless he shall have, after obtaining a certificate from the Principal of an Arts College showing that he has satisfactorily carried out the work appointed by the University for the first two terms in Arts, kept two terms at a College or Institution recognized for the purposes of the

^{*}The last examination under the old rules will be held in March 1939.

Intermediate Examination in Science by the University of Bombay, and unless he produces satisfactory testimonials in the prescribed form.

- O. 218. Candidates must forward their applications to the Registrar on or before the 20th February with certificates of attendance during the first term. Certificates of attendance during the second term should be forwarded by Principals of Colleges on or before the 10th March.
- O. 219. Candidates will be examined in one of the following groups of subjects:—
 - (A) Mathematics, Physics and Chemistry;
 - (B) Physics, Chemistry and Elementary Biology.
- (a) Candidates who have passed the examination in the A Group will be permitted, on the submission of a new application and the payment of a fresh fee, to appear again at the examination in the B Group and vice versa with exemption at their option from the subjects of Physics and Chemistry, provided they attend lectures (and laboratory work) in the third subject for a period of two terms at a College affiliated for this examination.
 - (b) The exemption referred to in (a) shall also apply to candidates who have passed in either of these groups at the Intermediate Examination in Science of any of the Universities or other Examining Bodies, the Intermediate Examination in Science of which is recognized as equivalent to the Intermediate Science Examination of this University.
- O. 220A. Candidates who have passed the B.A. (Hons.) Examination in the groups of Physics and Chemistry or Botany and Zoology will be allowed to appear at the Intermediate Examination in Science in groups A or B in the first case and in group B in the second case, with exemption, at their option, from the subjects in which they have passed the B.A. (Hons.) Examination, provided that they attend lectures and laboratory work in the remaining subject or subjects, for a period of two terms at a College affiliated for this Examination. Candidates so exempted shall not be eligible for a class or a University award.
- Candidates who have passed the B. Ag. Examination will be allowed to appear at this examination in group (B) without attendance at a College and will at their option be exempted from undergoing an Examination in Chemistry and Elementary Biology in that group. Candidates so exempted shall not be eligible for a class or for University awards.
- R. 84. There shall be two Papers in Mathematics of 100 Marks each and one Paper and one practical examination of 100 Marks each in all the other subjects.
- R. 85. On the recommendation of the Boards of Studies, the Academic Council may from time to time prescribe or recommend text-books in the various subjects of this examination and modify from time to time, as may be found necessary, the details of the theoretical and practical courses laid down for this examination.

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R. 86.

Syllabus.

I.—MATHEMATICS—(Two Papers.)
(As at the Intermediate Examination in Arts.)

R. 87.

II.—Physics.

(One Paper and one Practical Examination of three hours each.)

Candidates shall be examined in the following branches of the subject in accordance with details which shall be specified by the Academic Council, on the recommendation of the Board of Studies, from time to time —

General Physics: Mechanics (Kinematics and Kinetics), Statics, Hydrostatics, Properties of Matter.

Heat: Temperature, Quantity of heat, transference of heat, First Law of Thermodynamics.

Sound.

Light: Geometrical Optics.

Magnetism and Electricity: Magnetism, Statical and Current Electricity, Electromagnetism.

DETAILS:-

General Physics.

Introductory.—Matter and energy. Physical magnitudes, fundamental and derived units, dimensions, units of l, m and t: unit of angular measure. Measurement of length, vernier, micrometer screw, gauge cathetometer. Measurement of volumes, surfaces.

Kinematics.—Material particles, vectors and scalars, motion. Velocity, uniform and variable, graphical representation. Composition and resolution of velocities and accelerations. Hodograph motion in a circle. Periodic motion. Simple harmonic motion, velocity and acceleration of a S. H. M., Graphical representation and composition of S. H. M's.

Dynamics.—Newton's laws of motion, force, graphical representation, composition and resolution of forces acting at a point. Moment of a force, parallel forces, couples. Equilibrium of forces. Definition of work. Graphical representation, power, energy, kinetic and potential. Principle of the conservation of energy. Simple machines, the inclined plane, the screw, the balance. Statical friction. Limiting angle. Angle of repose. Centre of gravity; stable, unstable and neutral equilibrium. Laws of oscillation of a simple pendulum. Pendulum as a measure of time.

Properties of Matter.—General properties and states of matter. Pressure exerted by a fluid. Principle of Archimedes. Density and elasticity of gases (omitting Regnault's work). Air manometer, barometer. Mechanical air pump. Equilibrium of a liquid at rest, density of a liquid. Hydraulic press, pumps, syphon. Capillarity and surface tension phenomena, angle of contact. Properties of solids.

[Part II

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Malleability, ductility, hardness, density, elasticity of volume, elasticity of shape, elongation, Hook's law, Young's modulus.

Heat.

Temperature. Thermometric scales. Thermometer. Fixed points. Errors in mercury thermometers. Maximum and minimum thermometers. Linear expansion. Coefficient of linear expansion (first portion). Cubical expansion of solids. Expansion of non-isotropic bodies. Coefficient of expansion of fluids. Apparent expansion. Absolute expansion, Density of water at different temperatures, maximum density. Expansion of gases. Expansion of a gas at constant pressure. Increase of pressure of a gas at constant volume. Charles' Law. Absolute zero.

Quantity of heat. Specific heat of solids (omitting radiation correction). Specific heat of liquids.

Change of state. Melting point. Change in volume during fusion. Latent heat of fusion. Boiling point. Latent heat of vaporisation. Vapour pressure. Humidity—hygrometric state. Hygrometry. Conduction of heat. Transference of heat. Conduction. Measurement of conductivity (omitting Lee's method); Prevosts's theory of exchanges. Instruments for measuring radiant heat.

Mechanical theory of heat. Theories as to the nature of heat. Dynamical equivalent of heat. Joule's determination.

Sound.

Wave-motion, velocity of propagation. Wave-front. Ray. Production, propagation and measurement of sound. Quality of sound. Pitch of a note. Diatonic scale and simple interval. Reflection and refraction of sound. Theory and use of the sonometer. Resonators. Kundt's experiments. Audition. Human ear. Beats. Structure and function of the ear and throat.

Light.

Rectilinear propagation of light. Shadows. Pin-hole camera. The nature of light. Curvature of a surface. Images. Laws of reflection. Rotation of a plane mirror. Use of mirror and scale. Reflection in spherical mirrors. Image of a small object on the axis of a mirror. Reflection—Snell's Law. Refraction through a slab. Image of a point formed by refraction, a plain surface. Total internal reflection. Refraction through a prism. Refractive index from angle of minimum deviation. Lenses. Relative positions and size of image and object. The eye. Defects of vision. Simple microscope. Telescope. Illuminating power. Law of inverse squares. Unit of illuminating power. Photometry. Dispersion. Fraunhoter Lines. Achromatic prisms and direct vision spectroscope.

Magnetism and Electricity.

Natural and artificial magnets. Magnetic attraction and repulsion. Permanent and temporary magnetism. Magnetic lines of force. Fields of magnetic force. Molecular magnets. Coulomb's Law. The unit

magnetic pole. Magnetic moment. Strength of magnetic field. Couple acting on a magnet in a magnetic field. Couple due to the action of one magnet on another.

The magnetic elements. Measurement of the declination. Determination of the dip. Measurement of the horizontal force. Terrestrial magnetic lines. Continuous magnetic records. Diurnal range. Annual and secular changes. Magnetic storms.

Electrostatics.—Electrification by friction. Conductors and non-conductors. Two kinds of electrification. The gold leaf electroscope. Electrification by induction. Coulomb's law.

Electrical lines of force. Faraday's ice-pail experiment. Difference of potential. Equipotential surfaces. Electrification confined to the surface of a conductor. Force exerted on a charged body placed inside a hollow charged conductor.

Capacity of a conductor. Condensers.

The friction machine. The electrophorus. The water dropper. The Wimshurst machine.

The Electric Current.—The electric current. The E. M. F. Oersted's experiment. Lines of force of a conductor conveying a current. Electromagnetic unit of current. Units of quantity and of E. M. F. on the electromagnetic system. Field due to a circular conductor. Galvanometer. The tangent galvanometer (measurement of H.)

Ohm's law. Specific resistance. Standards of resistance. Resistance of systems of conductors. Shunts. Wheatstone's network of conductors. Wheatstone's bridge. Fall of potential along a wire in which a current is passing.

Joule's law. The mechanical equivalent of heat derived from electrical experiments.

Force acting on a straight conductor conveying a current when placed in a magnetic field. Force acting on a rectangular coil conveying a current when in a magnetic field.

Induced currents. Lenz's Law. Electromagnetic induction. Magnitude of the induced E. M. F. The earth inductor.

Electrolysis—Faraday's law. Electrolytic dissociation.

Practical Work.

(a) Every candidate shall complete a course of laboratory work of not less than 25 experiments as detailed by the Academic Council on the recommendation of the Board of Studies. Each candidate shall produce a certificate from the Head of the Department that he has completed in a satisfactory manner at least the prescribed number of exercises. Every candidate must record his observations directly in his laboratory journal and write therein a report of each exercise-performed. Every journal is to be signed periodically by a member of the laboratory staff and certified at the end of the year.

Practical Course.

(b) Candidates may be examined on any of the experiments shown below or on any others of a similar type done by them in the laboratory as shown in the journal. The journal shall be produced at the examination.

Experiments.

- 1. Use of balance. Method of oscillations.
- 2. Use of callipers.
- 3. Use of micrometer screw.
- 4. Use of spherometer.
- 5. Specific gravity. Specific gravity bottle.
- 6. Inclined plane.
- 7. Co-efficient of friction.
- 8. Force ratio of a pair of pulley blocks.
- 9. Y by stretching.
- 10. Atwood's machine.
- 11. 'g' by pendulum.
- 12. Verification of Boyle's law.
- 13. Surface tension.
- 14. 'u' by pin method.
- 15. Radius of curvature of a concave mirror.
- 16. Radius of curvature of a convex mirror.
- 17. Focal length of a convex lens.
- 18. Focal length of a concave lens.
- 19. Photometers. Rumford, Bunsen, Joly.
- 20. Testing a thermometer.
- 21. Boiling point of a liquid.
- 22. Co-efficient of linear expansion of a solid.
- 23. Specific heat of a solid.
- 24. Latent heat of fusion.
- 25. Latent heat of vaporisation.
- 26. Frequency of a tuning fork (String method.)
- 27. Velocity of sound (resonance).
- 28. Hygrometers.
- 29. Magnetic moment of a bar magnet.
- 30. Magnetic axis and meridian.
- 31. Tangent galvanometer.
- 32. Resistance by substitution.
- 33. Resistance by meter bridge.

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R. 88.

III.—CHEMISTRY.

(One paper and a Practical Examination of not more than six hours.)

Inorganic Chemistry.

Organic Chemistry.

Practical Chemistry.

Details of the syllabus will be specified from time to time by the Academic Council on the recommendation of the Board of Studies.

Inorganic Chemistry.

The character of physical and chemical changes including solutions, distillation, crystallization, dissociation, combustion, precipitation, neutralization, electrolysis, the conditions which influence and determine them and the attendant phenomena. Catalysis.

Acids and basis.

Oxides, their formation and classification.

The formation and decomposition of salts.

Oxidation and reduction.

The general laws of gases. Avogadro's hypothesis. Molecular weights. Experimental determination of the density of gases and of vapours. Atomic hypothesis. Experimental determination of atomic weights. Symbols, formulæ, equations and chemical calculations. The simple gas equation.

Gas mixtures. Diffusion. Osmotic pressure.

Mass action.

The atmosphere.

Oxygen and ozone: preparation and properties.

Hydrogen: preparation and properties.

Water: natural waters, temporary and permanent hardness, methods of softening on a large scale, water of crystallization, efflorescence, deliquescence, Hydrogen peroxide.

Carbon: varieties of carbon; carbon dioxide, the carbonates; carbon monoxide, producer gas, water gas, Chemistry of flame and coal gas.

Silicon: silica and silicates; bricks, glass, pottery.

Nitrogen: ammonia, oxides of nitrogen, nitrous acid and the nitrites; nitric acid and the nitrates.

Chlorine, bromine, and iodine: hydrochloric acid and the chlorides, bleaching powder and bleaching solution. Potassium chlorate. Hydrobromic and hydriodic acids. The family of the halogen elements including fluorine.

Sulphur: Sulphur dioxide and sulphur trioxide. Sulphuric acid and the sulphates. Sulphuretted hydrogen and the sulphides. Carbon disulphide. The oxygen-sulphur family.

Phosphorus: phosphorus pentoxide, phosphoric acid and the phosphates, phosphine; arsenic, antimony, and bismuth and their

compounds including arsenious oxide and arsenious acid, arsenic trichloride, arsenic oxide, arsenic acid, realgar, orpiment, arsine; antimony trioxide, trichloride and pentachloride, trisulphide and pentasulphide, stibine; bismuth trioxide, chloride and oxychloride, nitrate and oxynitrate; the nitrogen-phosphorus family.

Silver and copper and their compounds including silver nitrate, oxide, hydroxide, chloride, bromide, and iodide; cupric sulphate, nitrate, chloride, oxide, hydroxide, sulphide; cuprous chloride, oxide, sulphide; basic carbonates of copper.

Mercury and Zinc and their compounds including mercuric sulphate, chloride, nitrate, oxide, hydroxide, sulphide; mercurous nitrate, chloride, zinc sulphate, hydroxide, oxide, chloride, sulphide, carbonate.

Borax and boric acid. Aluminium and its compounds including aluminium sulphate and the alums, aluminium oxide, hydroxide, sodium aluminate, China clay; the action of aluminium on certain metallic oxides (Goldschmidt's process).

Tin and lead and their compounds including stannic chloride, sulphide, oxide, stannic and metastannic acids; stannous chloride, sulphide; lead nitrate, acetate hydroxide, oxides, sulphide; red lead and white lead.

The rusting of tin plate and of galvanized iron.

The Carbon-silicon-tin-lead family.

Chromium: chromates and dichromates, chromium trioxide, chromic oxide and salts.

Manganese: oxides and salts of manganese; manganates and permanganates.

Iron: cast iron, steel and wrought iron. Oxides of iron. Ferric chloride, hydroxide, ferrous sulphate, chloride, hydroxide.

Magnesium: magnesium sulphate, oxide and carbonate.

The compounds of calcium and barium, including calcium sulphate, phosphate, chloride, hydroxide, oxide, carbonate, and carbide; barium carbonate, chloride, sulphate, hydroxide and oxides.

Sodium and potassium and their compounds, including sodium chloride, sulphate, sulphide, carbonates, hydroxide, nitrate; potassium, chloride, sulphate, carbonates, hydroxide, nitrate, chlorate.

Ammonium salts, including ammonium sulphate, nitrate, chloride, carbonates, hydroxide, and sulphide.

Organic Chemistry.

Purification of organic substances. The detection of carbon, hydrogen, the halogens, nitrogen and sulphur. Ultimate analysis.

The principles of Organic Chemistry, illustrated by the study of the following substances:—

Methane, ethane, ethylene, acetylene, benzene and toluene. Methyl and ethyl alcohols; ether; ethyl Hydrogen sulphate. Ethyl chloride and iodide. Chloroform and iodoform.

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Formaldehyde, acetaldehyde, chloral and acetone.

Formic and acetic acids; ethyl acetate; acetyl chloride; chloro-acetic acid. Acetamide; aminoacetic acid, Urea.

Hydrocyanic acid; cyanogen.

Oxalic acid; lactic acid; tartaric acid.

Glycerol and glycerides; soaps.

Cellulose; starch, cane sugar; fructose; glucose.

Nitrobenzene, aniline and phenol.

Benzyl chloride and alcohol : benzal chloride and benzaldehyde ; benzotrichloride and benzoic acid. Salicylic acid.

Practical Examination.

Each candidate must produce a certificate from the Head of the Chemistry Department of his College that he has completed in a satisfactory manner a practical course on the lines laid down from time to time by the Academic Council on the recommendation of the Board of Studies and that his laboratory journal has been properly kept. Every candidate must have recorded his observations directly in his laboratory journal and written therein a report on each exercise performed. Every journal is to be signed periodically by a member of the laboratory staff. Candidates are to produce their laboratory journals at the practical examination. Each candidate is required to perform satisfactorily some portion at least of each of the exercises and is to be prepared to satisfy any tests demanded by the Examiners within the standard and scope of the syllabus prescribed. Experiments and observations should be made quantitative, as far as possible, and some knowledge be obtained as to the extent of the error incidental to each.

Course of Practical Work at present prescribed.

PART I.

- (a) (1) The cutting and bending of glass tubing. The preparation of simple apparatus involving the use of corks and tubes, $e.\ g.$, gas generating tubes and flasks, wash bottles.
- (2) Purification of liquids, e. g., water, by distillation; purification of salt, by crystallization.
- (3) Solubility of common salt or a similar substance in water. Determination of a solubility curve for a salt such as potassium chlorate.
- (4) Observation of the effect of heating sulphur, carbon, magnesium, iron, zinc, copper, aluminium, lead or other substances in air.
- (5) Determination of the change in weight on heating a known weight of magnesium or other substance in air.
- (6) Decomposition of salts on heating; the qualitative and quantitative results of heating such substances as lead nitrate, slaked lime, red lead.
- (7) Preparation of oxygen on a small scale; properties of the gas.

- (8) Determination of the percentage weight of oxygen given off on heating potassium chlorate and the calculation of the molecular weight of oxygen from the volume of oxygen collected.
- (9) Preparation on a small scale of gases, such as carbon dioxide, chlorine, nitric oxide, sulphur dioxide; properties of these gases.
- (10) Determination of the volume of hydrogen evolved when equal weights of different metals are dissolved in hydrochloric acid, and the equivalent weights of metals, such as magnesium, zinc, aluminium.
- (11) Oxidation and reduction: action of potassium chlorate, potassium nitrate, potassium permanganate solution, chlorine water, and other similar agents.
 - (12) The effect of heating metallic oxides with carbon.
- (13) The action of reducing agents such as stannous chloride solution or zinc and sulphuric acid.
- (14) The use of standard and normal solutions as in simple acidimetry and alkalimetry determinations. Simple determination by oxidation.

PART II.

- (b) (1) Neutralisation and salt formation; preparation of sodium chloride, potassium sulphate, potassium nitrate; preparation of barium sulphate, lead chromate, zinc sulphide by precipitation; preparation of lead nitrate from litharge; zinc sulphate from zinc; magnesium sulphate from magnesium carbonate. Preparation of other salts obtained by similar methods. Quantities of material and yield to be measured.
- (2) Candidates will be expected to detect the presence of any of the following elements and radicals:—Hydrogen, Potassium, Sodium, Ammonium, Barium, Calcium, Magnesium, Zinc, Iron, Aluminium, Manganese, Chromium, Silver, Lead, Mercury, Copper, Bismuth, Arsenic, Antimony, Tin (in the form of Oxide), Hydroxide (water excepted), Sulphide, Sulphate, Carbonate, Phosphate, Chromate, Chloride, Bromide, Iodide, Nitrate, in powders soluble in water or hydrochloric acid or solutions containing not more than one base and one acid in each. Both dry and wet methods should be used and confirmatory tests should be made. Candidates may be required to make preparations from the substances given for analysis.
- (3) Candidates may or may not be allowed to use their laboratory note-books, during the practical examination at the discretion of the Examiners.

IV.—ELEMENTARY BIOLOGY.

(One Paper and a Practical Examination of four hours.)

Details of the Syllabus will be specified from time to time by the Academic Council on the recommendation of the Board of Studies.

General Biology .-

The distinctive properties of living and non-living bodies. Distinction between animals and plants.

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The distinctive properties of protoplasm.

The cell, its structure, contents and its methods of division.

An elementary knowledge of evolution.

A.—Plants.—

1. The plant body, its parts, their forms and arrangement.

2. The internal structure of plants.

3. The functions of plant parts and tissues.

4. The principal divisions of the plant kingdom:

The above points are to be studied in an elementary manner from common plants, and in addition the following types are to receive special attention—

Bacillus, Yeast, Mucor, Spirogya, Nephrolepis, Cycas, Maize, Bean, Nymphæa.

B .- Animals .-

Histology.—The different kinds of animal tissues: Blood, epithelia, connective tissue, cartilage, bone, muscles and nerves.

Physiology.—Irritability, respiration, secretion, excretion, circulation of blood and metabolism (treated in an elementary way).

Development.—Elements of reproduction, sexual and asexual; embryology of the frog's egg up to the formation of the germinal layers.

Candidates will be required to show a practical knowledge of the structures, functions and life-history of—

Amoeba, Paramoecium, Hydra, Pheretima, Panulirus, Mosquito (external morphology only), Periplaneta and Rana.

Practical Examination.

(a) Every candidate shall complete a laboratory course in accordance with the Regulations issued from time to time by the Academic Council on the recommendation of the Board of Studies. Each candidate shall produce a certificate from the Principal of his College that he has completed in a satisfactory manner the prescribed course. Every candidate must record his observations directly in his laboratory journal. Every journal is to be signed periodically by a member of the laboratory staff and certified by him at the end of the year. Candidates are to produce their journals at the practical examination and such journals may be taken into account by the Examiners in assigning marks.

Practical Work.

(b) (1) The recognition, dissection, examination and description of the above-mentioned animals and plants and parts of them.

(2) The use of the microscope in examining the structure of animals and plants. The preparation of the abovementioned animals and plants and parts of them for the microscope.

Standard for Passing the Examination.

- R. 90. To pass the examination, a candidate must obtain thirty-three per cent. of the full marks in each paper and in each practical examination. In Mathematics, a candidate must obtain thirty-three per cent. of the total marks. Should a candidate, however, not obtain thirty-three per cent. of the full marks in one paper or practical examination only, or in Mathematics only, he may be declared, by a majority of not less than two-thirds of the Examiners present at the final meeting, to have passed the examination, provided he obtains at least forty per cent. of the total marks in all subjects taken together. Those of the successful candidates who obtain sixty per cent. of the total marks obtainable will be placed in the First Class, and those obtaining forty-eight per cent. in the Second Class.
- R. 91. A candidate who has obtained forty-four per cent. of the total marks in any subject (including the practical) at an examination may at his option, be excused from appearing in that subject (provided he has obtained the minimum in each paper and practical of that subject required by Regulation 90) at a subsequent examination and will be declared to have passed the whole examination when he has passed in all the subjects of the examination: Provided that in the subject or subjects in which he appears on the last occasion he must obtain the minimum in each paper or subject or practical required by Regulation 90. Candidates passing the examination in this manner in compartments will not be eligible for a class or for any prize or scholarship to be awarded at the examination.

(14 A).—INTERMEDIATE EXAMINATION IN SCIENCE (NEW RULES).**

0. 217. No candidate will be admitted to this examination unless he shall have, after obtaining a certificate from the Principal of a College affiliated to this University showing that he has satisfactorily carried out the work appointed by the University for the first two terms in Science, kept two terms at a College affiliated to the University for the purposes of the Intermediate Examination in Science, and unless he produces satisfactory testimonials in the prescribed form.

O. 217A.

Transitory.

Notwithstanding anything contained in the above Ordinance, a candidate who has obtained a certificate from the Principal of a College affiliated to this University showing that he has satisfactorily carried out the work appointed by the University for the first two terms in Arts before the bifurcation scheme came into force, shall be permitted to join the intermediate Science course; provided always that this concession shall continue in force for a period of three years with effect from the 20th June, 1938.

Same (Vide page 248.)

*The first examination under the New Rules will be held in the first half of 1939.

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- 0. 219. Candidates will be examined in the following heads:—
 - 1. English prose.
 - 2. (a) Composition in English or in a Modern Indian Language
 - (b) A paper in French or German.
 - 3. Physics.
 - 4. Chemistry.
 - 5. Mathematics.

or Geology or

Biology.

- 0. 220.
- (a) A candidate who has passed the Examination will be permitted, on the submission of a new application and the payment of a fresh fee, to appear again at the Examination with a new optional subject, with exemption, at his option, from the compulsory subjects or any of them, provided that he attends lectures (and laboratory work) in the new optional subject for a period of two terms at an affiliated college.
- (b) The exemption referred to in (a) shall also apply mutatis mutandis to candidates who have passed the Intermediate Examination in Science of any other University or Board of Intermediate Education which is recognised as equivalent to the Intermediate Examination in Science of this University.

ORDINANCES 220A AND 221 HAVE BEEN deleted.

R. 84. I. ENGLISH PROSE.—(One Paper of three hours, carrying 100 Marks).

There shall be one paper in Prose of three hours' duration, carrying 100 Marks. The Paper shall be on prescribed texts and shall include an essay based thereon, carrying 25 Marks.

- R. 85. (a) Composition in English or in a Modern Indian Language
 - (b) A paper in French or German.(One Paper of three hours, carrying 100 Marks).
 - (a) Composition in English or in a Modern Indian Language. Books will be prescribed.

The paper shall contain exercises in Composition based on books prescribed for general reading and shall test the candidate's ability to express himself correctly and idiomatically in the language, on the subject-matter of the books prescribed. The paper in the Modern Indian Language shall also contain an essay which has no bearing on the prescribed texts. The essay will be on a scientific subject.

(b) A paper in French or German.

Books will be prescribed.

The paper shall include passages in French or German for translation into English, but shall not include passages in English for translation into French or German. These passages shall be taken from the two prescribed texts, one of a general character and the other on a scientific subject.

R. 86.

3. PHYSICS.—(Two papers of two hours each, carrying 60 Marks each and a practical examination of not less than three hours carrying 80 Marks).

There shall be two Papers of two hours each carrying 60 Marks each, and a practical examination of not less than three hours carrying 80 Marks. The following course is prescribed:—

Heat, Light, Sound, Electricity and Magnetism.

Details.

(i) Papers.

First paper ...Heat, Light and Sound. Second paper ...Electricity and Magnetism.

First Paper.

Heat:

Conduction of heat, simple methods of measuring conductivity, radiant heat, theory of exchange, emission of heat, absorption of heat, instruments for measuring radiant heat.

Mechanical theory of heat, mechanical equivalent of heat and its determination (elementary methods), First law of thermodynamics.

Elementary kinetic theory of gases, Graham's law, Henry's law, Dalton's law; diffusion, viscosity and their measurements.

Light:

Dispersion, spectrometer, Fraunhofer's lines, chromatic and spherical aberration, achromatism, achromatic lenses and prisms (without detailed calculations), direct vision spectroscope.

Wave theory of light, elementary theory of interference, polarization, double refraction, rotation of the plane of polarization (omitting Fresnel's theory), simpler application of the above.

Compound microscope; ultra-microscope (principles only).

The spectrum; ultra-violet and infra-red radiations, their production and applications.

Sound:

Wave motion, longitudinal and transverse waves, wave-front velocity of sound; production, propagation and measurement of sound, quality of sound, pitch of a note, musical scales, reflection and refraction of sound and its applications.

Theory and use of the sonometer, resonator, beats, Kundt's experiments.

Structure and function of the human ear and of the throat.

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Second Paper:

Electricity and Magnetism.

Electric current, the e.m. f., the resistance.

Oersted's experiment, Ampere's rule, lines of force of a conductor conveying a current; force acting on a straight conductor conveying a current when placed in a magnetic field; force acting on a rectangular coil carrying current and placed in a magnetic field.

Electromagnetic units of quantity, current, e. m. f. and resistance and their dimensions. Field due to a circular current, Galvanometer, tangent Galvanometer (measurement of H).

Ohm's law, specific resistance, various arrangements of resistances, shunts. Wheatstone's net-work. Fall of Potential along a current-bearing wire conductor.

Joule's law, mechanical equivalent of heat derived from electrical experiments.

Induced currents, Lenz's law, electro-magnetic induction, magnitude of the induced e.m.f. The earth inductor.

Electrolytic dissociation, Faraday's laws. Applications of electrolysis.

Thermo-electricity; Thermopile and its applications; alternating and direct currents; dynamos and motors (omitting constructional details), transformer, induction coil, electric power installation and distribution, measurement of energy.

Discharge of electricity through gases, cathode rays, rontgen rays, radium and other radio-active substances, alpha, beta and gama rays. Measurement of radio-activity.

(ii) Practical:

(a) one experiment of an hour and a half.

and (b) a number of short exercises not less than six, of a total duration of an hour and half.

[The practical in part (b) should include a variety of operations, such as direct measurement of different physical magnitudes using precision instruments, tests on scientific habits, quickness of works, reliability, accuracy, identification, use of slide rule, making of diagrammatic sketches of apparatus or of electric connections, etc.]

Every candidate shall complete a course of laboratory work of not less than 25 experiments as detailed by the Academic Council on the recommendation of the Board of Studies. Every candidate must record his observations, directly in his laboratory journal and write therein a report of each exercise performed along with a diagrammatic sketch of the apparatus used. Every exercise is to be signed by a member of the laboratory staff and the journal is to be certified at the end of the year by the Head of the Department. Candidates may be examined on any of the typical experiments given below or on any other experiments which do not involve either a new

principle or a new operation which is not contained in the list. It is therefore not necessary to mark any exercise as compulsory.

- 1. Use of the slide rule.
- 2. Atwood's machine.
- 3. Measurements of the coefficients friction.
- 4. Study of the properties of an inclined plane.
- 5. Study of the properties of various systems of pulleys.
- 6. Hooke's law and its applications, including the determination of Young's modulus.
- *7. Verification of the Boyl's law of gases.
- 8. Use of a travelling microscope, surface tension measurements.
- 9. Calibration of the bore of a thermometer.
- 10. Cubical expansion of water.
- 11. Constant-volume air thermometer.
- 12. Specific heat with radiation correction.
- 13. Specific heat by the method of cooling (law of radiation).
- 14. Determination of J by an electrical method.
- 15. Measurement of thermal conductivity by a simple method.
- 16. Frequency of a tuning fork by resonance.
- 17. Frequency of a tuning fork by using a sonometer.
- 18. Melde's experiment.
- 19. Magnifying power of a microscope.
- 20. Magnifying power of a telescope.
- 21. Use of a simple spectroscope for measuring refractive index.
- 22. Magnetic moment of a bar magnet and determination of H.
- 23. Use of a tangent galvanomoter (determination of H.)
- 24. Use of Wheatstone's bridge for measuring an unknown resistance.
- 25. Measurement of the resistance of a galvanometer by Kelvin's method.
- 26. Measurement of the resistance of a cell by Mance's method.
- 27. Measurement of a low resistance by the fall of potential method.
- 28. Comparison of E. M. F. using a potentiometer.
- 29. Use of a voltameter.
- 30. Measurement of electrical energy consumed in a circuit.
- R. 87. 4. CHEMISTRY.—(Two Papers of two hours each carrying 60 Marks each, and a practical examination of not less than three hours carrying 80 Marks.)

^{*}This experiment will come into operation from 1st June 1939, and is substituted for (Determination of Young's modulus by the bending of a bar).

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There shall be two papers of two hours each carrying 60 marks each. One of the papers shall be on Inorganic Chemistry and the other on Theoretical and Organic Chemistry. The practical examination shall be of not less than three hours' duration. The examiners may reserve some marks for the record of work as shown in the Journals. Candidates will be examined in the following syllabus:—

Inorganic Chemistry.

The Character of physical and chemical changes including solution, distillation, crystallisation, dissociation, combustion, precipitation, neutralization, electrolysis, the conditions which influence and determine them and the attendant phenomena. Catalysis. Dialysis.

Acids and bases.

Oxides, their formation and classification.

The formation and decomposition of salts.

Oxidation and reduction.

Laws of chemical combination. The elements.

The general laws of gases. Avogadro's hypothesis. Molecular weights. Experimental determination of the density of gases and of vapours. Atomic hypothesis. Equivalent weights, Experimental determination of atomic weights. Symbols, formulæ, equations and chemical calculations. The simple gas equation.

Gas mixtures. Diffusion.

Osmosis; Osmotic pressure.

Mass action with examples, such as the synthesis of ammonia, the formation of esters, the formation of sulphur trioxide.

Colloids and their elementary properties.

Chemical equilibrium and the influence of temperature on chemical equilibrium.

The atmosphere.

Oxygen and Ozone: preparation and properties.

Hydrogen; preparation and properties.

Water; natural waters, temporary and permanent hardness, methods of softening on a large scale; water of crystallization, efflorescence, deliquescence. Hydrogen peroxide.

Carbon; varieties of carbon; carbon dioxide, the carbonates; carbon monoxide, producer gas, water gas. Chemistry of flame and coal gas.

Silicon; silica and silicates; glass.

Nitrogen; ammonia; oxides of nitrogen; nitrous acid and the nitrites; nitric acid and the nitrates.

Chlorine, bromine, iodine and fluorine; hydrochloric acid and the chlorides, bleaching powder and bleaching solutions; Hydrobromic, hydriodic and hydrofluoric acids.

Sulphur; sulphur dioxide and sulphur trioxide; sulphuric acid and the sulphates; sulphuretted hydrogen and the sulphides; carbon disulphide. Phosphorus, phosphorus pentoxide, phosphoric acid and the phosphates, phosphine; arsenic, antimony and bismuth and their compounds including arsenious oxide, and arsenious acid, arsenic trichloride, arsenic oxide, arsenic acid, the sulphides of arsenic, arsine; antimony trioxide, trichloride and pentachloride, trisulphide and pentasulphide, stibine; bismuth trioxide, chloride and oxychloride, nitrate and oxynitrate.

Silver, copper and gold and their compounds including silver nitrate, oxide, hydroxide, chloride, bromide, and iodide; cupric sulphate, nitrate, chloride, oxide, hydroxide, sulphide; cuprous chloride; oxide sulphide; basic carbonates of copper; gold chloride.

Mercury, zinc and cadmium and their compounds including mercuric sulphate, chloride, nitrate, oxide, hydroxide, sulphide; mercurous nitrate, chloride; zinc sulphate, hydroxide, oxide, chloride, sulphide, carbonate; cadmium sulphate, hydroxide, oxide, chloride, sulphide, carbonate.

Borax and boric acid. Aluminium and its compounds including aluminium sulphate and the alums, aluminium oxide, hydroxide, sodium aluminate; China clay; bricks; pottery; the action of aluminium on certain metallic oxides (Goldschmidt's process).

Tin and lead and their compounds including stannic chloride, sulphide, oxide; stannic and metastannic acids; stannous chloride, sulphide; lead nitrate, acetate, hydroxide, oxides, sulphide; red lead and white lead.

The rusting of tin plate and of galvanized iron.

Chromium; chromates and dichromates, chromium trioxide; chromic oxide and salts.

Manganese: oxides and salts of manganese; manganates and permanganates.

Iron, cobalt and nickel and their compounds: cast iron, steel, and wrought iron: oxides of iron; ferric chloride, hydroxide; ferrous sulphate, chloride, hydroxide; cobalt sulphate, nitrate, sulphide; nickel sulphate, carbonate, carbonyl, sulphide.

Magnesium; magnesium sulphate, oxide, carbonate and chloride.

Calcium, strontium and barium and their compounds; calcium sulphate, phosphate, chloride, hydroxide, oxide, carbonate and carbide; strontium carbonate, chloride, sulphate, hydroxide, and oxides; barium carbonate, chloride, sulphate, hydroxide and oxides.

Sodium and potassium and their compounds; sodium chloride, sulphate, sulphide, carbonates, hydroxide, nitrate; potassium chloride, sulphate, carbonates, hydroxide, nitrate, chlorate.

Ammonium salts, including ammonium sulphate, nitrate, chloride, carbonates, hydroxide, and sulphide.

N. B.—Attention should be drawn to the "family" relationships of the various elements.

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Organic Chemistry.

Definition of organic compounds. Purification of organic substances. Criteria of purity of organic compounds. Determination of melting and boiling points. Determination of molecular weights. Isomerism and polymerism. The detection of carbon, hydrogen, the halogens, nitrogen and sulphur. Ultimate analysis.

The principles of organic chemistry, illustrated by the study of the following substances:—

Methane, ethane, ethylene, acetylene, benzene and toluene.

Methyl and ethyl alcohols; ether; ethyl hydrogen sulphate.

Ethyl chloride and iodide. Chloroform and iodoform.

Amines as illustrated by ethylamine.

Formaldehyde, acetaldehyde, chloral and acetone.

Formic, acetic and butyric acids; palmatic, stearic and oleic acids; ethyl acetate; acetyl chloride; chloroacetic acid; acetamide, urea; aminoacids as illustrated by aminoacetic acid.

Hydrocyanic acid; cyanogen.

Oxalic acid; lactic acid; tartaric acid; citric acid.

Glycerol and glycerides; soaps.

Cellulose; starch, cane sugar; fructos, glucose; glucosides as illustrated by amygdaline.

Proteins; Uric acid.

Nitrobenzene; aniline, acetanilide; phenol, resorcinol.

Benzyl chloride and alcohol; benzal chloride and benzaldehyde; benzotrichloride and benzoic acid. Phenolic acid; Salicylic acid, gallic acid.

Candidates will be expected to have seen demonstration tests for the presence of carbon, hydrogen, nitrogen, halogens, sulphur, phosphorous in organic substances.

Practical Examination.

Each candidate must produce a certificate from the Head of the Chemistry Department of his College that he has completed in a satisfactory manner a practical course on the lines laid down from time to time by the Academic Council on the recommendation of the Board of Studies and that his laboratory journal has been properly kept. Every candidate must have recorded his observations directly in his laboratory journal and written therein a report on each exercise performed. Every journal is to be signed periodically by a member of the laboratory staff. Candidates are to produce their laboratory journals at the practical examination. Each candidate is required to have performed satisfactorily some portion at least of each of the exercises and to satisfy any tests demanded by the Examiners within the standard and scope of the syllabus prescribed. Experiments and observations should be made quantitative as far as possible, and some knowledge be obtained as to the extent of the error incidental to each.

Practical Work.

PART I.

- 1. The cutting and bending of glass tubing. The preparation of simple apparatus involving the use of corks and tubes, e. g., gas generating tubes and flasks, wash bottles.
- 2. Purification of liquids, e. g., water by distillation: purification of a salt by crystallization.
- 3. Solubility of common salt or a similar substance in water. Determination of a solubility cure for a salt such as potassium chlorate.
- 4. Observation of the effect of heating sulphur, carbon, magnesium, iron, zinc, copper, aluminium, lead or other substances in air.
- 5. Determination of the change in weight on heating a known weight of magnesium or other substance in air.
- 6. Decomposition of salts on heating; the qualitative and quantitative results of heating such substances as lead nitrate, slaked lime, red lead.
 - 7. Preparation of oxygen on a small scale, properties of the gas.
- 8. Determination of the percentage weight of oxygen given off on heating potassium chlorate and the calculation of the molecular weight of oxygen from the volume of oxygen collected.
- 9. Preparation on a small scale of gases, such as carbon dioxide; chlorine, nitric oxide, sulphur dioxide; properties of these gases.
- 10. Determination of the volume of hydrogen evolved when equal weights of different metals are dissolved in hydrochloric acid, and the equivalent weights of the metals, such as magnesium, zinc, aluminium.
- 11. Oxidation and reduction; action of potassium chlorate, potassium nitrate, potassium permanganate solution, chlorine water, and other similar agents.
 - 12. The effect of heating metallic oxides with carbon.
- 13. The action of reducing agents such as stannous chloride solution or zinc and sulphuric acid.
- 14. The use of standard and normal solutions as in simple acidimetry and alkalimetry determinations. Simple determination by oxidation.

PART II.

- 15. Neutralisation and salt formation; preparation of sodium chloride, potassium sulphate, potassium nitrate; preparation of barium sulphate, led chromate, zinc sulphide, by precipitation; preparation of lead nitrate from litharge; zinc sulphate from zinc: magnesium sulphate from magnesium carbonate. Preparation of other salts obtained by similar methods. Quantities of material and yield to be measured.
- 16. Candidates will be expected to detect the presence of any of the following elements and radicals:—hydrogen, potassium, sodium,

ammonium, magnesium, barium, strontium, calcium, iron, aluminium, chromium, manganese, nickel, cobalt, zinc, cadmium, mercury, copper, bismuth, arsenic, antimony, tin, silver, lead in the form of oxide, hydroxide (water excepted), sulphide, sulphate carbonate, phosphate chromate, chloride, bromide, iodide, nitrate, in powders soluble in water or hydrochloric acid or in solutions containing not more than one base and one acid in each. Both dry and wet methods should be used and confirmatory tests should be made. Candidates may be required to make preparations from the substances given for analysis.

- 17. Organic chemistry. Candidates will be expected to detect the following organic compounds given as single substances: ethyl alcohol, glycerol, chloroform, acetic acid, citric acid, oxalic acid, Phenol, benzoic acid, salicylic acid, aniline.
- N. B.—Candidates must not be allowed to use their laboratory note-books during the practical examination.
- R. 88.
- (i) MATHEMATICS
- (ii) GEOLOGY
- (iii) BIOLOGY.
- (i) MATHEMATICS. (Two Papers of three hours each, carrying 100 marks each.)

(The syllabus shall be the same as that prescribed for the Intermedidate Arts Examination. Vide R 15 ante.)

(ii) GEOLOGY. (Two Papers of two hours each, carrying 60 marks each, and a practical examination of not less than three hours, carrying 80 marks.)

There shall be two Papers of two hours each, and carrying 60 marks each. One of the papers shall be on Physical Geography and the other on the Elements of Structural and Dynamic Geology. The following syllabus is prescribed:—

PAPER I.

Physical Geography.

The earth as a planet, its general relation to the other members of the solar system. Form, size and motions of the earth. The agents at work on and beneath the surface of the earth; water; frost; snow; ice; rain.

The atmosphere—its composition, height, density, pressure, temperature, moisture, and movements; refraction; twilight; lightning and thunder; aurora borealis; weather and climate.

The hydrosphere—The sea; its distribution, depth, temperature and movements; tides. Rivers and Lakes.

The lithosphere—The chief constituents of the earth's crust. Rocks and their origin, occurrence and main classification. The destruction, construction and gradual evolution of the crust of the

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earth and of its surface features. The interior of the earth and the phenomena connected with its internal heat: general notion of volcanoes, earthquakes and hot springs.

PAPER II.

Elements of Structural and Dynamic Geology.

Mountain building. Elevation and depression of land. The crust of the earth. Temperature and density of the earth. Minerals, and their principal physical properties which help the identification of various species. Igneous, sedimentary and metamorphic rocks, and their obvious physical properties by which one may be distinguished from the other; their origin, composition and distribution; cleavage and dislocation of rocks. General conception of metamorphism, and formation of mineral veins. Intrusive and interbedded types of rocks.

Practical Examination.

Every student shall complete a laboratory course in accordance with the regulations issued from time to time by the Academic Council. Each candidate shall produce a certificate from the Professor or teacher that he has completed in a satisfactory manner at least the prescribed laboratory course and that his laboratory journal has been properly kept.

Every candidate must record his observations directly in his laboratory journal and write a full report on the work performed. The journal is to be certified at the end of the year. Candidates are to produce their journals at the practical examination and each candidate is to be examined practically on the work done by him in the laboratory as shown in his journal which shall be taken into account by the examiners in assigning marks.

Course of Practical Work.

- 1. The identification of specimens of common, typical minerals and rocks.
 - (a) Determination of the following minerals by sight and with the aid of such instruments as the lens, the hydrostatic balance and the blow-pipe.
 - 1. Quartz, 2. Orthoclase, 3. Albite, 4. Augite, 5. Horn blende, 6. Asbestos, 7. Muscovite, 8. Biotite, 9. Talc, 10. Zeolite, (stilbite,) 11. Tourmaline, 12. Garnet, 13. Pyrolusite, 14. Haematite, 15. Magnetite, 16. Ironpyrites, 17. Calcite, 18. Gypsum.
 - (b) Recognition of the following rocks in hand specimens with the aid of the lens.
 - Granite, 2. Diorite, 3. Gabbro, 4. Syenite, 5. Basalt,
 Deccan Trap, 7. Laterite, 8. Shale, 9. Sandstone,
 Limestone, 11. Slate, 12. Schist, 13. Gneiss, 14. Quartzite.
- 2. A general description to be entered in the laboratory journal of the physical properties and chemical composition as determined by the blowpipe of at least five of the above-mentioned minerals and the

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results of the examination of mineral composition, structure, texture, etc., of at least ten rocks from the abovementioned list.

R. 89.

(iii) BIOLOGY. (Two Papers of two hours each, carrying 60 Marks each, and a practical examination carrying 80 Marks.)

Candidates will be examined in the following syllabus:-

Botany.

External Morphology.

General characters of roots and stems. Their external morphology with modifications in relation to special functions.

Study of the leaf base, stipules, petiole, leaf blades, venation, margin and apex. Simple and compound leaves. Palmate and Pinnate leaves. Phyllotaxis modifications of leaves in relation to special functions.

Inflorescence: Raceme, Cyme, Spike, Catkin, Spadix, Umbel, Capitulum. Study of the various parts of a flower and their commoner variations, Hypogynous, perigynous and epigynous flowers.

Study of simple and aggregate fruits: achene, cypsela, caryopsis, samara, nut, capsule, legume, follicle, drupe, berry, siliqua, etaerio, syconus, sorosis. Albuminous and exalbuminous seeds. Epigeal and hypogeal germination. Germination of Mango, Maize and Cucurbita.

Internal Morphology.

Study of a typical vegetable cell. Mitosis, Reduction division. Cellulose and its modifications—lignin, cutin, suberin.

General characters of meristematic and permanent tissues. Distinguishing characters of Parenchyma, Sclerenchyma and Collenchyma. Mechanical and conducting tissues.

Distinction between the structure of the roots, stems and leaves of monocotyledons and dicotyledons. Normal secondary growth in thickness in stems and roots.

PHYSIOLOGY.

Absorption of water; Conduction of water. Elementary study of Transpiration, Photosynthesis, Respiration and Growth. Elementary knowledge of plant response to light, gravity and moisture.

CLASSIFICATION.

The general principles underlying the main divisions of the vegetable kingdom as illustrated by the detailed study of the structure and life history* of the following plants:—

^{*} Detailed comparative study of the gametophytes in the last three plants is not expected.

Bacteria, Spirogyra, Mucor, Yeast, Moss, Nephrolepis, Cycas, Sunflower and Maize:—

General Biology.

General idea of organic Evolution; evidences of Evolution, Variation, Adaptation and Heredity; theories of Evolution and Mendelism—including knowledge of the dihybrid ratio, 9:3:3;1.

Practical Examination.

(a) Every candidate shall complete a laboratory course in accordance with the Regulations issued from time to time by the Academic Council on the recommendation of the Board of Studies. Each candidate shall produce a certificate from the Principal of his College that he has completed in a satisfactory manner the prescribed course. Every candidate must record his observations directly in his laboratory journal. Every journal is to be signed periodically by a member of the laboratory staff and certified by the head of the Department at the end of the year. Candidates are to produce their journals at the practical examination and such journals shall be taken into account by the Examiners in assigning marks.

Practical Work.

- (b) 1. Recognition, dissection (excepting Liver-fluke, Snail and Mosquito), examination and description of the abovementioned animals and plants and parts of them. Liverfluke is to be studied by prepared slides only and the dissection of Mosquito is to be confined to its mouthparts only.
 - 2. The use of the microscope. The preparation of the above-mentioned animals and plants and parts of them for microscopic study.

Zoology.

Structure and life history of the following types of animals:-

Amoeba, Paramoecium, Hydra, Liver-fluke, Pheretima, Lobster, Cockroach, Mosquito, and Frog.

Hystology: Elementary knowledge of the following:-

Cell, Tissues, Epithelial, connective, muscular, nervous, and glandular only reproductive. Organs as illustrated by different parts of the alimentary cannal of the frog with the glands associated with it.

Elementary Physiology: As given in Foster and Shore, or any other elementary book dealing (with Human Physiology.)

Development of the egg of the frog upto the formation of three germinal layers.

Classification: The general characters of Phyla of the animal kingdom:

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Invertebrata: Protoza, Porifera, Coeleoterata, Plathyelmintha, Nemathelmintha, Echinodermata, Annelida, Arthropoda, Mollusca.

Vertebrata: Pisces, Amphibia, Reptilia. Aves and Mammals.

General Biology.

General idea of Organic Evolution; evidences of evolution, variation, adaptation and heredity; theories of evolution, Mendelism, including experiments illustrating dihybrid ratios.

Practical Examination.

(a) Every candidate shall complete a laboratory course in accordance with the regulations issued from time to time by the Academic Council on the recommendation of the Board of Studies. Each candidate shall produce a certificate from the Principal of his College that he has completed in a satisfactory manner the prescribed course. Every candidate must record his observations directly in his laboratory journal. Every journal is to be signed periodically by a member of the laboratory staff and certified by the head of the Department at the end of the year. Candidates are to produce their journals at the practical examination and such journals shall be taken into account by the Examiners in assigning marks.

Practical Work.

- (b) (1) Recognition, dissection, examination and description of the abovementioned animals and plants and parts of them, excepting liver-fluke and mosquito. Liver fluke is to be studied by prepared slides only and the dissection of Mosquito is to be confined to its mouth-parts only.
- (2) The use of the microscope. The preparation of the abovementioned animals and plants and parts of them for microscopic study.

Standard for Passing the Examination.

- R. 90.

 To pass the examination, a candidate must obtain, except in languages, 33 per cent. of the full marks in papers in each head and in each practical examination. In Mathematics a candidate must obtain 33 per cent. of the total marks. In each of the languages, a candidate must obtain 30 per cent. of the marks. Should a candidate, however, not obtain the minimum percentage of marks required for passing in the paper in one head or in one practical examination only, or in the papers only in subjects in which there is no practical examination, he may be declared by a majority of not less than two-thirds of the examiners present at the final meeting, to have passed the examination, provided he obtains at least 40 per cent. of the total marks in all subjects taken together. Those of the successful candidates who obtain 60 per cent. of the total marks obtainable will be placed in the First Class, and those obtaining 45 per cent. in the Second Class.
- R. 91. A candidate who has obtained forty per cent. of the marks in either head of languages or forty-four per cent. of the total marks

in any head (including the practical) other than languages at an examination may, at his option, be excused from appearing in that subject (provided he has obtained the minimum in each paper and practical of that subject required by Regulation 90) at a subsequent examination, and will be declared to have passed the whole examination when he has passed in all the subjects of the examination: Provided that in the head or heads in which he appears on the last occasion he shall obtain the minimum in each head of passing as required by Regulation 90. Candidates passing the examination in this manner in compartments will not be eligible for a class or for any prize or scholarship to be awarded at the examination.

R. 91A. (Transitory.)

- (1) The Intermediate Science Examination according to the old regulations will be held for the last time in 1939.
- (2) Candidates who have been exempted under the old regulations from the subjects of Mathematics, Physics, Chemistry or Biology shall be exempted from the corresponding subjects of the Intermediate Science Examination under the new regulations.
- (3) Candidates who fail to pass the Intermediate Arts or Intermediate Science Examination under the old regulations in 1939, will not be permitted to appear for the same examination under the new rules unless they have kept two terms in the subjects of study for which they were not exempted.

(15).—EXAMINATION FOR THE DEGREE OF B. Sc.

Admission.

0. 222.

No candidate will be admitted to this examination unless he shall have, after passing the Intermediate Examination in Science, kept four terms at a College or Institution recognized for the purposes of the examination for the Degree of Bachelor of Science by the University of Bombay, and unless he produces satisfactory testimonials in the prescribed form.

- [N. B. (1).—The terms referred to in these Ordinances are terms in the cience Faculty unless otherwise specified; and two such terms and three terms in the Medical Faculty are to be deemed to be equivalent to one another.
- (2).—Bachelors of Agriculture who are exempted from undergoing an examination in Chemistry and Elementary Biology at the Intermediate Examination in Science under Ordinance 221 will be permitted to keep terms for the B. Sc. Examination before passing the Intermediate Examination in Science, provided that the terms so kept will be regarded as terms for the B. Sc. Examination only when the candidates have passed the Intermediate Examination in Science.

0. 223.

A student who has passed in all subjects but one at the Intermediate Science Examination in conformity with Regulation 91 will be allowed to keep terms and appear for the B. Sc. Examination, after keeping four terms, (except when the candidate's subject for B. Sc. is either Human Anatomy and Embryology or Animal

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Physiology, in which case he must have passed the Intermediate Science Examination), but will not be declared to have passed the B. Sc. Examination under any circumstances, unless he has passed in the remaining subject of the Intermediate Science Examination held either in a previous or in the same examination season.

- 0. 224.
- A candidate may appear in his Subsidiary subject only after two terms if he chooses, and if he passes in it, he may appear for the Principal subject only after keeping two more terms. A candidate who has once passed the B. Sc. Examination with one Subsidiary subject may, on the submission of a new application and the payment of a fresh fee, appear again in another subsidiary subject without appearing for the whole examination, provided that he has completed the minimum attendance in an affiliated College at a course of instruction in the new subsidiary subject in which he wishes to appear during two additional terms.
- 0. 225.
- Candidates must forward their applications to the Registrar on or before the 20th February with certificates of attendance during the first three terms. Certificates of attendance during the fourth term should be forwarded by the Principals of Colleges on or before the 10th March. Applications for admission to the October Examination in the Subsidiary subjects should reach the Registrar not later than the 1st of September.
- 0. 226.
- A candidate who has passed the examination will be permitted on the submission of a new application and the payment of a fresh fee, to appear again at the examination in a Principal subject other than the one in which he has already passed, provided he has completed the minimum attendance in an affiliated College at a course of instruction in the subject in which he has to appear during two additional terms. A candidate appearing again at the Examination under this Ordinance will on passing in a new principal subject (retaining his original subsidiary Subjects in which he shall not be permitted to appear again), be eligible for a class or distinction in accordance with Regulation 104, provided, however, that he shall not be entitled to a class or distinction on the basis of the total marks in the original subsidiary subject and the new Principal subject.
- 0. 226A.
- A candidate who has passed the Examination will be permitted, on the submission of a new application and the payment of a fresh fee, to appear again at the Examination, interchanging his Principal and Subsidiary Subjects, provided that he, after passing the B. Sc. Examination once, has completed the minimum attendance in an affiliated College at a course of instruction in the subject which he offers as his Principal subject during two additional terms. A candidate who desires to interchange his subjects as aforesaid shall be entitled to claim exemption from appearing at the Subsidiary examination in the subject which he took as his Principal subject on the first occasion. Such a candidate shall not be eligible for a class or distinction.
- R. 92.
- (a) Candidates must select any two of the following subjects, one of them being the Principal subject and the other Subsidiary. A student who takes the group of Physics and Chemistry for the B.Sc.

Examination shall take a course in Calculus irrespective of the fact whether Physics is his Principal or his Subsidiary subject:—

- 1. Mathematics,
- Physics,
 Chemistry,
- 4. Botany, 5. Zoology,
- 6. Geology,

- 7. Microbiology,
- 8. Animal Physiology,9. Comparative Anatomy
 - and Embryology,
- 10. Experimental Psychology.
- (b) On the recommendation of the Boards of Studies, the Academic Council may from time to time prescribe or recommend text-books in various subjects of the examination and modify from time to time, as may be found necessary, the details of the theoretical and practical courses laid down for the examination.
- R. 93.

 (a) There shall be 600 marks for a Principal subject, each paper and each Practical examination, in subjects other than Physics, to carry 75 marks when there are four papers and four practical examinations or eight papers, and each paper and each Practical examination to carry 100 marks when there are three papers and three practical examinations. In Physics, there shall be four papers carrying 100 marks each and four practical examinations each of them to carry 50 marks.
 - (b) There shall be 300 marks for a Subsidiary subject, each paper or practical examination carrying 75 marks in all subjects except Physics. In Physics, there shall be two papers of 100 marks each, and two practical examinations, each of them carrying 50 marks.

Syllaous.

R. 94.

(1).—Mathematics.*

As a Subsidiary Subject

(Four Papers of three hours each.)

Paper I.

Analytical Geometry.—Properties of ellipse, parabola, hyperbola when referred to rectangular or polar co-ordinates, reduction and tracing of curves given by the general equation of the second degree.

Solid Geometry.—The straight line, plane, sphere, ellipsoid and transformation of axes.

Papers II and III.

Differential and Integral Calculus and Differential Equations.—The course will be as defined for the B. A. Pass course examination and shall include in addition De Moiver's Theorem, hyperbolic functions, double integration, moments of inertia, Fourier's series

^{*}The last examination under the existing Syllabus will be held in the year 1939.

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without proof, simultaneous differential equations of the first order and elementary ideas on partial differential equations, and the examples set for solution shall be of a simple type.

Paper IV.

Statics and Dynamics (Analytical) of two dimensions. Examples set for solution will be of a comparatively simpler type.

As a Principal Subject

The examination will be identical with that for B. A. Honours Examination in Mathematics and the total marks in each paper will be proportionately reduced, i. e., each paper will carry twelve-seventeenths of the marks assigned to it at the B. A. Examination.

(1 A)—MATHEMATICS. (Revised Course)*

As a Subsidiary Subject.

(Four Papers of three hours each.)

Paper I.

(Geometry)

(i) Conic Sections

Polar equation of a conic. Tracing of conics.

Books recommended:

Loney's Coordinate Geometry : Part I.

Bagi: Analytical Geometry of Conic Sections.

(ii) Solid Geometry

The straight line, plane, sphere, cone and the other conicoids, given by their standard equations. Equations of the tangent plane and normal to a surface, and the tangent to a curve given by parametric equations.

Book recommended:

Bell: Coordinate Geometry of three dimensions. [Chapters I-III, V-VII and articles 179, 186-188 (omitting oblique axes)]

(Only such examples as are direct applications of the bookwork will be set.)

Paper II.

(Algebra, Trigonometry and Differential Calculus)

(i) Algebra

Binomial, Exponential and Logarithmic series.

(ii) Trigonometry

De Moivere's Theorem for a rational index, series for $\sin \theta$ and $\cos \theta$. Exponential, logarithmic and circular functions of a complex variable. Hyperbolic functions.

The first examination under the revised course will be held in the first half of 1940.

Differential Calculus

Functions, limits, continuity of functions. Derivatives. Higher Derivatives. Rolle's Theorem. Mean Value Theorem. Partial Differentiation. Curvature. Infinite Series. Taylor's Theorem for functions of one or two variables.

Book recommended:

Gibson—Ch. III (§§ 25, 28, 29, 30); Chs. IV; V; VI; VII; IX; X; XI (§§ 89-95); Ch. XVI (§§ 140-142, 144, 145); Ch. XVII (§§ 147, 150); Ch. XVIII (§§ 152-154); Ch. XIX (§§ 157, 158.)

Paper III.

(Integral Calculus and Differential Equations)

(i) Integral Calculus

Integration. Definite Integrals. Geometric applications, Double-Integrals. Gamma and Beta functions. Fourier's Series (calculation of coefficients).

Book recommended:

Gibson—Chs. XIII; XIV (§§ 124–128); Ch. XV; Ch. XXII (§§ 184,189–192).

(ii) Differential Equations

Differential Equations of first and second orders. Linear equations with constant coefficients. Simultaneous Differential Equations.

Book recommeded:

Murray's Differential Equations; Chs. I; II (§§ 7-16; 20,21); Ch. VI; Ch. VIII (§§ 76,77,81); Ch. IX; Ch. XI;

Paper IV

(Statics and Dynamics)

(i) Statics

Forces in two dimensions. Virtual work. General determination of centres of gravity. Stability. Equilibrium of strings.

Book recommended:

Lamb's Statics: Chaps. I, II (Omit §§ 16,17), III (Omit §§ 27,28),. VI (Omit §§ 55, 56, 59), VII, VIII, (Omit §§ 72-79), IX.

(ii) Dynamics

The syllabus is the same as that for the B.Sc. Principal.

As a Principal Subject.

The examination will be identical with that for B. A. Honours Examination in Mathematics and the total marks in each paper will be proportionately reduced, *i.e.*, each paper will carry twelve-seventeenths of the marks assigned to it at the B. A. Examination.

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R. 95.

(2)—Physics

As a Subsidiary Subject.

(Two Papers and two Practical Examinations of not more than three hours each.)

The Course and Syllabus are identical with those for the B. A. Honours Examination.

As a Principal Subject.

(Four Papers and four Practical examinations of not more than three hours each).

Candidates will be examined in the following branches of the subject in accordance with details which shall be specified by the Academic Council on the recommendation of the Board of Studies from time to time:—

Course prescribed :-

General Physics: Mechanics, Hydrostatics, Hydrodynamics, Properties of Matter.

Heat: Kinetic Theory, Change of State. Transference of Heat. Thermodynamics.

Light: Geometrical and Physical Optics, Relativity.

Sound: Mathematical Theory, Physical Applications.

Electricity and Magnetism: Magnetism, Electrostatics, Electro-Magnetism—Alternating Current, Units and Dimensions, Conduction in cases, Radioactivity, Electron Theory.

The papers will be constituted as follows:

Paper 1.—Properties of Matter and Molecular Physics.

Paper 2.—Heat and Sound.

Paper 3.—Light and Radioactivity.

Paper 4.—Electricity and Magnetism including Electron Theory.

General Physics.

Fundamental units of measurement. Force, torque, work, energy, stable and unstable equilibrium.

Rotational motion.—Rotating Bodies. Moment of inertia and moment of Momentum. Elementary gyrostat.

Simple Harmonic Motion.—Simple and compound pendulums, Bifilar suspension. Maxwell's needle. Theory of the balance.

Theory of Oscillations.—Corrections to observations on pendulums due to various causes. Coupled systems. Damped oscillations, forced oscillations.

Gravitation.—Newton's law. Gravitational potential. Determination of the constant of gravitation.

Elasticity.—The different moduli of elasticity and the relations between them. Bending. Torsion. Deformation of the cross section due to bending.

Bulk-moduli of solids and liquids. Tensile strength of liquids.

Surface Tension.—Pressure due to different curvatures of liquid surfaces. Stability of films. Ripples on the surface of a liquid.

Linear and rotational motion of a fluid omitting the theory of vortices. Laws of transfer of energy and momentum by the steady motion of a fluid. Attraction of two sources or two sinks.

Waves on the Surface of a Liquid.—Energy of waves. Deep water and shallow water waves.

Flows of a Viscous Fluid.—Viscosity, lubrication. Viscosity of

gases.

The Molecular structure of fluids.—Kinetic theory of gases, Vander Waal's theory. Viscosity, thermal transpiration, osmotic pressure. Application to solutions.

Heat.

Kinetic Theory of Matter.—Kinetic theory of gases. Mean square velocity. Mixture of gases. Internal energy and energy of translation. Joule's method of calculating R. M. S. Effusion through an orifice. Thermal transpiration. Mean free path. Molecular dimensions. Dependence of M. F. P. on molecular dimensions and on the density. Calculation of M. F. P. from the viscosity. Conduction of heat in gases. Diameter of molecules. Forces on unequally heated surface in high vacua. Vander Waal's equation.

Change of State.—Gas and vapour. Condensation of nuclei. Measurement of a vapour density and vapour pressure. Latent heat. Specific heat of saturated steam. Indicator diagrams. Critical point. Reduced isothermals. Liquefaction of gases. Melting from point of view of kinetic theory.

Radiation.—Radiant energy, Bolometer. Emissive power. Radiation of different wave lengths. Comparison of absorptive powers of reflecting powers. Theory of exchange. Uniform temperature enclosures. Effect of the medium on radiation. Bodies exchanging radiations at different temperatures. Radiations and temperature. Newton's law. Dulong and Petit's law. Stefan's law. Constants of radiation. Solar constant.

Thermodynamics.—Isothermal and adiabatic changes. Thermodynamics of change of state. Thermodynamics of radiation.

Light.

Geometrical Optics.—Fundamental ideas. Theory of spherical mirrors and lenses. Thick lenses and systems of lenses. Defects of the image. Chromatic aberration.

Physical Optics.—Interference. Diffraction. Polarisation and double refraction.

Optical rotation and the analysis of polarised light.

Spectroscopy, the ultra-violet, the infra-red and X-rays.

The electromagnetic theory of light. (Treatment according to Starling's 'Electricity' sufficient.)

The relative motion of matter and ether.

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Electricity and Magnetism.

Magnetism.—The same as for the Subsidiary B. Sc., but more in detail.

The Electric Current.—The same as for the Subsidiary but more in detail.

Galvanometers.—Kelvin's a static needle galvanometer, the suspended coil galvanometer. Duddell's thermo-galvanometers. Sensitiveness of a galvanometer.

Electrostatics.—Chapter V. Starling's 'Electricity' sufficient.

Electrolysis.

Thermo-electricity.

Electro-magnetics.

Magnetic Properties of Materials.—Theories of magnetisation. Induction within a magnetic material. Demagnetisation, practical methods. Cycle by ballistic method. Cycle of magnetisation—hysteresis. Iron and steel. Work due to hysteresis. Steinmetz law. Iron and steel alloys. Magnetic alloys of non-magnetic substances. Magnetic curve tracer. Weak magnetic fields. Time lag. Very strong fields. Variation of temperature. Mechanical stress. Molecular theory. The magnetic circuit.

Varying Current.—Inductance. Growth of current. Decay of current. Inductance of a solenoid. Co-axial cylinders. Practical unit of inductance. Charge and discharge of a condenser. Measurement of high resistance by leakage. Mutual inductance. Calculation of mutual inductance. Current in secondary. Charge flowing in secondary circuit. Divided circuit. The induction coil. Circuit with inductance capacity and resistance (charge, frequency of oscillation, limiting, case, discharge, limiting conditions, rate of discharge, discharge examined by rotating mirrors.)

Alternating Currents.—Circuit with inductance and resistance. Vector diagram. Impedance and reactance. Measuring instruments. Virtual current and E. M. F. Measurement of inductance. Power in alternating current circuit. Power factor. Wattmeters. Circuit containing capacity, inductance and resistance. Choking coil. Duddell oscillograph. Rotating magnetic field. Single-phase motor. Imaginary quantities. Rotating vector. Application of imaginaries to circuit having inductance, capacity and resistance.

Units and Dimensions.—Electrical units. Electromagnetic system of units. Electrostatic system of units. Relation between units of the two systems. Determination of the Ohm (Rotating coil method, method of Lorentz.)

Electromagnetic Radiation.—Fundamental equations. Maxwell's displacement current. Propagation of a plane wave. Magnetic field and motion of Faraday tubes. Plane wave as a motion of Faraday tubes. Energy of wave. Poynting's theorem. Pressure on surface due to incident wave. Index of refraction of light.

Conduction in Gases. Rodio-activity. Electron-theory.

Sound.

Wave-motion, transverse and longitudinal. Elastic vibrations. Composition of simple harmonic motions. Fourier's theorem.

Stationary waves.

Damped and undamped oscillations, forced oscillations, beats.

Reflection of sound.

Sound, its production, propagation and velocity.

Musical scale. Tonometry. Stroboscope.

Practical Work.

- (a) Each candidate shall complete a course of laboratory work consisting of not less than 25 experiments of the subsidiary standard as given above and of not less than 25 experiments of the Principal standard as detailed by the Academic Council on the recommendation of the Board of Studies and given below. Each candidate shall produce a certificate from the head of the Department that he has completed in a satisfactory manner at least the prescribed number of experiments. Every candidate must record his observations directly in his laboratory journal and write therein a report on each exercise performed. Every journal is to be signed periodically by a member of the laboratory staff and certified at the end of the year. A candidate may be examined on any of the typical experiments given below or any other experiments done by him in the laboratory as shown in the journal. The journal shall be produced at the examination.
 - (b) The following are typical experiments:—
 - 1. The balance: ratio of the arms, various methods of weighing, corrections, calibration of a set of weights.
 - 2. Measurement of the period of an oscillating body. Comparison of movements of inertia. Logarithmic decrement.
 - 3. Determination of Young's modulus and rigidity of wire by Searle's method.
 - 4. Use of cathetometer for determining Young's modulus.
 - 5. Maxwell's needle.
 - 6. Determination of n and Y from experiments with a flat spiral spring.
 - 7. Surface tension of a drop of a liquid.
 - 8. Coefficient of viscosity of a fluid with corrections. Method: flow through a tube, oscillating disc.
 - 9. Correction of thermometer reading for emergent column,
 - 10. Cubical expansion.
 - 11. Thermal expansion of gases.
 - 12. Measurement of the heat of solution.
 - 13. Measurement of vapour density by Hofmann's method.
 - 14. Sonometer.
 - 15. P by total reflection.

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16. Calibration of a spectroscope, using the dark lines in the solar spectrum.

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- 17. Wave length by biprism.
- 18. " diffraction.
- 19. " Newton's rings.
- 20. Resolving power of a grating.
- 21. Focal length and positions of principal planes of a thick lens.
- 22. To test the flatness of the faces of a piece of glass.
- 23. Analysis of an illiptical vibration.
- 24. The spectrophotometer.
- 25. Measurement of the absorption curve of a solution.
- 26. Figure of merit of a galvanometer.
- 27. Calibration of a metre-bridge.
- 28. Comparison of a capacities.
- 29. Measurement of E. M. F. of a thermo-couple.
- 30. Measurement of magnetic induction (Earth inductor and ballistic galv).
- 31. Hysteresis loop (magnetometer method).
- 32. Measurements of inductances. Mutual inductances. Self-inductances.

Candidates may be asked during the examination to perform any of the experiment mentioned in the above list or any other, provided that the exercise does not involve any new mode of measurement with which the candidate is not expected to be familiar, and that the same can be completed in three hours.

R. 96.

(3).—CHEMISTRY.

As a Subsidiary Subject.

(Two Papers and two days' Practical Examination.)

The Course and Syllabus are identical with those for the B.A. Honours Examination.

As a Principal Subject

(Four Papers and at least three days Practical Examination.

Theoretical Examination

N. B.—Candidates will be expected to have a general acquaintance and knowledge of the trend of modern research in the following three branches of chemistry, of the main land-marks in the historical development of chemistry, and of the contributions of workers of outstanding importance towards this development.

Paper I. Inorganic Chemistry:

The subject as for the B. Sc. Subsidiary Examination, treated in a more advanced manner, including the consideration of all elements and their compounds as also:

A.—Manufacturing methods including discussions of the physicochemical principles involved in the manufacture of :

Helium, Hydrogen, Chlorine, Oxygen, Sulphuric acid, Nitric acid, Alkalies, Methanol, Iron, Copper, Silver, Lead, Aluminium, Nickel, Chromium, Platinum and Gold.

- B.-(i) Hydrides, Carbides, Nitrides and Silicates.
 - (ii) Chemistry of water for potable and industrial purposes.
 - (iii) Fixation of Nitrogen; Fertilisers.
 - (iv) Per-acids and salts.
 - (v) Corrosion and passivity of metals.
 - (vi) Alloys, ferrous and non-ferrous.
 - (vii) Rare earths.
 - (viii) Complex salts.
 - (ix) Allotropy.
 - (x) Catalysis in industry.
 - (xi) Application of electricity in chemical industry.
 - (xii) Fuels.
 - (xiii) Technical applications of high and low temperatures.
 - (xiv) Organic reagents used in inorganic analysis.

Paper II. Organic Chemistry:

The subject as for the B. Sc. Subsidiary Examination treated more fully including the consideration of:

- (i) Theories of valency including the electronic theory as applied to organic compounds.
- (ii) Substitution in the benzene nucleus.
- (iii) Tautomerism.
- (iv) Sterio-chemistry of organic compounds.
 - (a) Geometrical isomerism with particular reference to the oximes.
 - (b) Optical isomerism.
 - (c) Stereoisomerism of cyclic compounds.
 - (d) Cycloparaffins. Strainless rings.
- (v) Principles underlying the determination of the configuration of glucose and fructose and of the glucosides: Salicin and Indican.
- (vi) Condensation reactions as applied to the synthesis of organic compounds.

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- (vii) Unsaturation.
- (viii) Carotene. Mono-and dicyclic terpenes: Terpineol, Dipentene, Camphor, Pinene, Isoprene, Methyl-heptenone and the Citral group. Rubber.

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- (ix) A General knowledge of Vitamins and Hormones, as illustrated by the study of Ascorbic acid, Thyroxin, and Adrenaline.
- (x) Synthetic drugs such as, Salvarsan, Atoxyl, Veronal, Acriflavine, Hexyl-resorcinol, Eucaine, Novocaine, Stovaine, Plasmoquine, and Atebrine.
- (xi) Alkaloids: Conüne, Nicotine, Atropine, Cocaine and Quinine.
- (xii·) Relation between colour and chemical constitution. Absorption spectra.
- (xiii) Flavones and related compounds. Chlorophyll.
- (xiv) Principal classes of dyestuffs.
- (xv) Enzymes and their action.
- (xvi) Polypeptides. Depsides. Tannins.
- (xvii) Abnormal valency.
- (xviii) Catalysis in organic chemistry. Catalytic reduction and oxidation of organic substances.

Paper III. Physical Chemistry:

The subject as for the B. Sc. Subsidiary Examination treated more fully including the consideration of:—

First law of thermodynamics and its application to thermochemistry. Calculation of maximum work in simple physical changes. Energy changes in chemical transformations. Second law of thermodynamics. Application of thermodynamics to the law of mass action. Relations between osmotic pressure, the lowering of the vapour pressure, depression of the freezing point and elevation of the boiling point. Kinetics of chemical reactions treated in greater detail. Chemical affinity. Influence of temperature on the velocity of chemical reactions. Activation theory. Theories and application of catalysis. Relation between chemical and electrical energy. Concentration and gas cells. Electro-potential series of elements. Decomposition potential. Polarisation. Storage cells. Overvoltage Hydrogenion concentration and its applications. Electro-metric titration.

Theories of solution. Behaviour of strong electrolytes. Ionisation in non-aqueous solvents.

Emission and absorption spectra including Band and Raman spectra and their applications.

Radio-activity. Positive-ray analysis. Mass spectra. Isotopes and Isobars.

X-rays, crystal structure of a simple substance like sodium or potassium chloride.

The structure of the atom. Periodic classification in relation to the structure of the atom. Artificial disintergration of elements. Electronic conception of valency. Dipole moments. Photo-chemical reactions. Law of photo-chemical equivalence. Industrial applications of colloids. Donnan equilibria.

Paper IV.—Essay or Essays on Chemical Subjects.

Practical Examination.

Inorganic Chemistry:

- (1) Qualitative analysis of artificial mixtures of moderate complexity (with not more than one substance, insoluble in acids, such as lead sulphate, barium sulphate or silica), containing not more than six radicals (organic radicals are not to be included).
- (2) The candidate should be acquainted with the methods of quantitative analysis of mixtures containing not more than two basic radicals and one acidic radical, and shall have analysed at least six such mixtures.
- (3) The candidate is expected to have carried out the analysis of at least *two* from each of the following heads:
 - (i) Silver coin, Nickel coin, German silver;
 - (ii) Galena, Dolomite, Felspar.

Organic Chemistry.

- (1) The candidate should be acquainted with methods of estimating the elements occurring in organic compounds and should have carried out the estimation of carbon, hydrogen, nitrogen and a halogen or sulphur.
- (2) The candidate should be acquainted with the methods of estimation of the following groups occurring in organic compounds and should have estimated at least four of them:—
 - $-NH_{2}$, -N: N-,: CO, -CHO, $-CONH_{2}$. $-OCH_{3}$, -OH $-COOC_{2}$ H_{5} , $-NO_{2}$, and $-OCOCH_{3}$.
- (3) Preparation and purification of:

Aniline, Benzidine, Iodobenzene, Benzophenone by Friedel and Crafts' reaction, compounds involving the use of acetoacetic ester, malonic ester, and a Grignard reagent, (one of each type) Quinoline (Skraup's Synthesis).

- (4) Detection of at least ten organic compounds (containing two characteristic groups) like the following: Nitraniline, Salicylic acid, Nitrophenol, Sulphanilic acid.
- (5) Separation and identification of the constituents of a mixture of two organic compounds which may be either (i) basic and acidic, (ii) acidic and neutral, (iii) basic and neutral or (iv) such as are capable of being separated by

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physical properties. Derivatives of the separated constituents must be prepared.

Physical Chemistry:

- (1) Molecular refractivity of liquids.
- (2) Vapour pressure of liquids.
- (3) Transition temperature of solids.
- (4) Depression of freezing point of solutions.
- (5) Elevation of boiling point of solutions.
- (6) Adsorption.
- (7) Viscosity of liquids.
- (8) Optical activity of solutions of optically active compounds.
- (9) Heat of combustion.
- (10) Electrical conductivity of electrolyte solutions.
- (11) Transport number of ions.
- (12) H-ion concentration.
- (13) Electrometric titration.
- (14) Velocity of simple bimolecular reactions.

The candidate shall have performed at least ten experiments, one each from the above sub-heads, and shall be acquainted with the general procedure involved in performing experiments of the types enumerated above.

Note:—Questions on practical chemistry and on the interpretation of analytical results may also be set in the Theoretical Examination.

R. 97.

(4).—BOTANY. *

As a Subsidiary Subject

(Two Papers and two Practical Examinations.)

The Course and Syllabus are identical with those for the B. A. Honours Examination.

As a Principal Subject

(Four Papers and four Practical Examinations)

Paper I.—Organography, External and Internal Morphology.

Paper II.—Classification, Plant Geography and Fossil Botany.

Paper III.—Physiology, Ecology and Genetics.

Paper IV.—An essay or essays on a botanical subject.

Practical I.—External Morphology.

Practical II.—Internal Morphology.

^{*}The last examination under the present syllabus will be held in the year 1939. The first examination under the revised Syllabus will be held in the first half of 1940.

Practical III.—Classification (including fossil plants).

Practical IV.—Physiology and Ecology.

Details of the theoretical and practical courses will be specified from time to time by the Academic Council on the recommendation of the Board of Studies.

The Subsidiary Syllabus plus a knowledge of the following:—

I.—Organography and External Morphology.—Embryology, development of organs, evolution of sex, evolution of floral parts and mechanisms.

II.—Internal Morphology.—Detailed knowledge of cell structure including study of the cell wall, cytoplasm and its inclusions, nucleus and the phases of its division, anatomico-physiological study of tissues and tissue systems.

The various types of vascular construction, monostelic, schizostelic, dictyostelic, and their sequence in evolution.

The internal structure of reproductive organs, reproductive cells, their development and history.

III.—Physiology.—Detailed study of the physiology of the call and of the energy relations of the plant.

IV.—Ecology.—Plant communities, their origin, development and classification.

V.—Plant Geography.—The main plant geographical regions of the world, the main characters of their vegetation.

VI.—Fossil Botany.—A general idea of the various groups of fossil plants, their relationships to the living groups and their importance in tracing the sequence of plant forms in evolution.

VII.—Genetics.—The physical basis of inheritance, experimental methods of studying evolution, variation, mutation, the study of hybridisation before Mendel, Mendelism, Neo-Mendelism.

VIII.—Classification.—A detailed knowledge of the following groups and types in addition to those prescribed for the Subsidiary subject:—

Thallophyta.—Myxomycettes, Heterokontæ, Ulothrix.

Bryophyta.—Riccia, Pellia, Anthoceros.

Pteridophyta.—Osmunda, Ophioglossum, Angiopteries, Marsilia, Azolia.

Spermaphyta.—Gymnospermæ Gentaceæ.

Angiospermae.—Monocotyledones:-Hydrocharitaceæ, Bromeliaceæ, Pontederiaceæ, Commelinaceæ, Lemnaceæ, Pandanaceæ, Araceæ, Naiadaceæ, Cyperaceæ—Dicotyledones; Casuarinaceæ, Menispermaceæ, Nymphæceæ, Papaveraceæ, Capparidaceæ, Portulacaceæ, Guttifferæ Sterculiaceæ, Tiliaceæ, Meliaceæ, Bhamnaceæ, Ampelidaceæ Sapindaceæ,

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Moringaceæ, Crassulaceæ, Rhizophoraceæ, Lythraceæ, Onagraceæ, Passifloraceæ, Umbelliferæ, Sapotaceæ, Boraginaceæ, Lentibulariaceæ, Bignoniaceæ, Pedalineæ, Acanthaceæ, Chenopodiaceæ, Polygonaceæ, Loranthaceæ.

Practical Examination.

Each candidate must produce a certificate from the Head of the Department of his College that he has completed in a satisfactory manner a practical course on the lines laid down from time to time by the Academic Council on the recommendation of the Board of Studies and that his laboratory journal has been properly kept. Every candidate must have recorded his observations directly in his laboratory journal and written therein a report on each exercise performed. Every journal is to be signed periodically by a member of the laboratory staff. Candidates are to produce their laboratory journals at the practical examination.

The practical examination shall consist of :-

- (1) A knowledge of microtechnique including fixing, staining and section cutting.
- (2) A practical knowledge of ordinary experiments in the nutrition, growth, response and reproduction of plants.
- (3) A practical study of the external and internal structure of the various ecological types of plants. An acquaintance with the apparatus for measuring environmental factors.
- (4) The identification with the aid of floristic works of plants belonging to the orders in Section VIII above and in Section V of the Subsidiary subject course.

(4A).—Botany (Revised Syllabus).*

As a Subsidiary Subject.

(Two Papers and two Practical Examinations).

The Course and Syllabus are identical with those for the B. A. Honours Examination.

As a Principal Subject.

(Four Papers and four Practical Examinations, each of 75 marks.)

Paper I.—Organography, External and Internal Morphology.

Paper II.—Classification, Plant Geography and Fossil Botany.

Paper III.—Physiology, Ecology and Genetics.

Paper IV.—An essay or essays on a botanical subject or subjects.

Practical I.—External Morphology.

Practical II.—Internal Morphology.

Practical III.—Classification (including fossil plants.)

Practical IV.—Physiology and Ecology.

^{*}The Revised Course will apply to the examinations to be held in 1940 and subsequent years.

Details of the theoretical and practical courses will be specified from time to time by the Academic Council on the recommendation of the Board of Studies.

The subsidiary Syllabus plus a knowledge of the following :-

(i) External Morphology and Organography:

Embryology, development of organs, evolution of sex, evolution of floral parts and mechanisms.

(ii) Internal Morphology:

Detailed knowledge of cell structure including the study of cell wall, cytoplasm and its inclusions, nucleus and the phases of its division, anatomico—physiological study of tissues and tissue systems.

The various types of vascular construction—monostelic, schizostelic dictyostelic, and their sequence in evolution.

The internal structure of the reproductive organs, reproductive cells, their development and history.

(iii) Physiology:

Detailed study of the physiology of the cell and of the energy relations of the plant.

(iv) Ecology:

Plant communities, their origin, development and classification.

(v) Plant Geography:

The main plant-geographical regions of the world, the main characters of their vegetation.

(vi) Fossil Botany:

A general idea of the various groups of fossil plants, their relationships to the living groups and their importance in tracing the sequence, of the plant forms in evolution.

(vii) Genetics:

The physical basis of inheritance; experimental methods of studying evolution, variation, mutation; the study of hybridisation before Mendel, Mendelism and Neo-Mendelism.

(viii) Classification:

Principles of classification. A detailed knowledge of the following types and groups:—

Thallophyta—Bacteria; Cyanophyceæ (Gleocapsa, Nostoc, Oscillaria, Rivularia, Scytonema); Flagellatae; Diatomeæ; Chlorophyceæ (Chlamydomonas, Pandorina, Eudorina, Volvox, Protococcus, Scenedesmus, Pediastrum, Hydrodictyon, Ulothrix, Oedogonium, Vaucheria, Coleochaete, Caulerpa); Conjugatæ (Cosmarium, Zygnema, Spirogyra, Mougeotia); Characeæ (Chara); Phæophyceæ (Ectocarpus, Dictyota, Fucus); Rhodophyceæ (Batrachospermum, Polysiphonia); Myxomy-

cetes Phycomycetes (Pythium); Ascomycetes (Eurotium, Claviceps); Basidiomycetes (Ustilago, Puccinia, Agaricus), Lichens.

Bryophyta—Hepaticæ (Riccia, Marchantia, Pellia, Anthoceros), Musci (Funaria).

Pteridophyta—Filicineæ (Ophioglossum, Angiopteris, Osmunda Nephrolepis, Marsilia, Azolla); Equisetineæ (Equisetum); Lycopodineæ (Lycopdium, Selaginella); Isoetes.

Spermatophyta—A. Gymnospermæ:—Cycadaceæ, Coniferæ and Gnetaceæ.

- B. Angiospermæ:—(1) Monocotyledons: Hydrocharitaceæ, Orchidaceæ, Scitaminaceæ, Amaryllidaceæ, Liliaceæ, Pontederiaceæ, Commelinaceæ, Palmæ, Pandanaceæ, Araceæ, Lemnaceæ, Naidaceæ, Cyperaceæ, Gramineæ.
- (2) Dicotyledons:—Ranunculaceæ, Magnoliaceæ, Anonaceæ Menispermaceæ, Nymphoeaceæ, Papaveraceæ, Cruciferæ, Capparidaceæ, Portulacaceæ, Guttiferæ, Malvaceæ, Sterculiaceæ, Tiliaceæ, Rutaceæ, Meliaceæ, Rhamnaceæ, Ampelidaceæ, Sapindaceæ, Anacardiaceæ, Moringaceæ, Leguminosæ, Crassulaceæ, Rhizophoraceæ, Combretaceæ Myrtaceæ, Lythraceæ, Onagraceæ, Passifloraceæ, Gucurbitaceæ, Umbelliferæ, Rubiaceæ, Compositæ, Sapotaceæ, Apocynaceæ, Asclepiadaceæ, Boraginanceæ, Convolvulaceæ, Solanaceæ, Scrophulariaceæ, Lentibulariaceæ, Bignoniaceæ, Pedalineæ, Acanthaceæ, Verbenaceæ, Labiatæ, Nyctaginaceæ, Amarantaceæ, Chenopodiaceæ, Polygonaceæ, Loranthaceæ, Euphorbiaceæ, Urticaceæ, Casuarinaceæ.

In studying the families special attention should be paid to plants of economic importance.

Practical Examination:—Each candidate must produce a certificate from the Head of the Department of his College that he has completed in a satisfactory manner a practical course on the lines laid down from time to time by the Academic Council on the recommendation of the Board of Studies and that his laboratory journal has been properly kept. Every candidate must have recorded his observations directly in his laboratory journal and written therein a report on each exercise performed. Every journal is to be signed periodically by a member of the laboratory staff. Candidates are to produce their laboratory journals at the practical examination.

Excursions for the study of plants in their natural habitat should be frequent and should include at least one in a tract other than the local one. Observations on such excursions should be recorded in a journal to be shown to Examiners.

The practical examination shall consist of :-

- (1) A knowledge of microtechnique including fixing, staining and section cutting.
- (2) A practical knowledge of ordinary experiments in the nutrition, growth, response and reproduction of plants.

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- (3) A practical study of the external and internal structure of the various ecological types of plants. An acquaintance with the apparatus for measuring environmental factors.
- (4) The identification with the aid of floristic works of plants belonging to the orders in section VIII above.

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(5).—Zoology.

As a Subsidiary Subject

(Two Papers and two Practical Examinations.)

The Course and Syllabus are identical with those for the B. A. Honours Examinations.

As a Principal Subject

(Four Papers and four Practical Examinations.)

Paper I.—Essay or Essays on a Zoological subject, including Physiology or Zoology.

Paper II.—Invertebrates—Anatomy and Physiology.

Paper III.—Vertebrates—Comparative Anatomy, Physiology and Palaentology.

Paper IV.—Cytology, Histology and Embryology.

Practicals: not more than six hours each:-

Practical I.—Dissection of animals.

Practical II.—Identification of animals and their parts.

Practical III.—Microscopic Technique.

Practical IV .- Viva voce.

The Subsidiary Syllabus plus the following should be studied:-

Cytogy.—Parthenogenesis, Sex chromosomes, Golgi Apparatus and other cell inclusions.

Embryology.—Metamorphosis of Frog. Development of chick for the first three days. Formation of feetal membrances in chick and rabbit. The following larvæ should be studied:—

Amphiblastula, Actinula, Ephyra, Planula, Cercaria, Hexacanth larva, Trochophore, Phyllosoma, Mysis, Megalopa, Zoæa, Nauplius, various types of insect larvæ, Glochidea, Veliger, Pluteus, Bipinnaria, Tornaria, Auricularia, Ascidian Tadpole.

Philosophy of Zoology.—Convergent and Divergent Evolution. Neo-Lamarckism, Neo-Darwinism, etc., Distribution of Animals in time and space. Outlines of the history of Zoology.

Systematic Zoology.—All classes including the exceptions of the B. Sc. Subsidiary standard should be studied. Candidates must show a personal and practical acquaintance with dissections structures, functions and life history of such animals as may be from time to time prescribed by the Academic Council on the recommendation of

the Board of Studies. The following animals marked with an asterisk are at present prescribed. They must be able to identify as thoroughly as possible unmarked animals:

Amœba,* Parmœcium,* Vorticella,* Entamœba,* Polystomella,*
Arcella,* Euglina,* Volvox,* Noctiluca,* Herpetomonas,*
Tryponosoma,* Laverania,* Monocystics,* Euplotes, Opalina,
Nectotherus, Spongilla,* Leucosolenia,* Grantia,* Hydra,*
Obelia,* Tealia, Sertularia, Halocordyle,* Campanularia,*
Hydractinia,* Ctenaria,* Trachymedusæ, Narcomedusæ, Physalia,* Porpita,* Valella,* Charibdea, Aurelia,* Edwardsia,*
Alcyonium,* Gorgonia,* Cavernularia,* Pennatula,* Pleurobrachia,* Bræ, Tricladida,* Planaria,* Distomum,* Tænia,*
Amphistomum, Ascaris,* Filaria, Drocunculus,* Nemertinia,
Sagitta,* Folynoe,* Saballid,* Nereis,* Arenicola, Serpulid,*
Pectinaria, Spirorbis, Pheretima,* Megascolex,* Hirudo,*
Thalassema, Sipunculua,* Brachionous.*

Branchipus,* Cyclops,* Cypris,* Daphnia,* Balanus,* Lepas,* Penæus,* Scylla,* Squilla, Panulirus,* Sacculina,* Gammarus,* Pagurus,* Mysis,* Argulus, Lepisma, Forficula. Periplaneta,* Culex or Anopheles,* Mallophaga, Acridium, Hierodula, Grillotalpa, Odontotermes, Aeschnid, Musca,* Cimex, Xenopsylla, Scolopendra,* Lygæus, Nepa, Gerris, Aphis, Coccid, Buthus,* Limulus, Ixodes, Peripatus, various types of insects, mouth parts, six typical Butterflies and Moths,* Wasps, Apis, Formica, Melolontha, Coccinillid, Buprestid, Curculionid, Dytiscus, Hippobosca, Oestrus, Heteropoda, Pycnogonidia.

Unio,* Placuna,* Aplysia,* Patella,* Ampullaria, Ariophanta, Doris,* Cardium, Teredo, Sepia,* Loligo, Octopus,* Nautilus, Dentalium Nucula, Mytillus, Pecten, Ostrea, Nenus, Solen, Chiton,* Margaritifera, Oliva, Trochotoma, Conus, Strombus, Cyprea, Trigonia.

Flustra,* Crisia, Lingula,* Asteria Echinus, Ophiuroid, Antedon, Cucumaria.*

Balanoglossus, Amphioxus, Doliolum, Salpa, Polycarapa,* Compound Ascidian,* Petromyzon, Lepidosiren, Acipenser, Chiemera, Carcharias,* Zygæna, Chiloscyllium,* Rhyncobatus, Narcinea, Trygon, Ophichthys, Aryus, Barbus, Chirocenttus, Clupea, Coilia, Harpodon, Belone, Hemirhamphus, Exocoeuts. Serranus, Drepene, Upeneoides, Pterois, Polynemus, Sciæna,* Trichiurus, Caranax, Stromateus, Cybium, Echeneis Boleophthalmus, Mugil, Anabas, Synaptura, Triacanthus, Obstracion, Tetradon, Hyppocampus, Rana,* Rhacophorus, Bulo,* Tylotriton, Ichthyophis, Triton, Pipa, Amblystoma, Axolotl.

Calotes,* Varanus,* Hemidactylus,* Sitana, Draco, Uromastix, Ophisaurus, Mabuia, Chamæleon, Typhlops, Python, Eryx, Sylibiura, Lycodon, Dipsadomorphus, Zamenis,* Tropidonotus, Chersydrus, Dryophis, Bungarus, Naia Lachesis, Echis, Vipera, Hydrus Enhydrina, Crocodilus, Gavialis, Trionyx,* Testudo, Chelone. Struthio, Spheniscus, Podiceps Pelecanus, Ardea, Phænicopterus, Anser, Cygnus, Falco, Milvus, Pseudogyrus, Lopophorus, Grus, Fulica, Bubulcus, Larus, Columba,* Palæornis. Eudynamis, Upupa, Alcedo, Strix,* Brachypternus, Coracias, Zantholæma, Passer, Corvus, Ploceus. Dicrurus, Orthotomus, Acridotheres, Galerita, Coccystes, Molpastes, Copsychus, Argya, Archæopteryax.

Echidna, Ornithorhynchus, Macropus, Manis, Phocæna, Halicore, Lapus, Equus, Hystrix, Mus, Gerbillus, Funambulus, Pteropus,* Synopterus, Megaderma, Paracechinus, Hyæna, Canis, Galiopithecus, Crocidura, Felis,* Viverricula, Paradoxurus, Herpestes, Pitheculus, Macacus.

Practical Examination.

Each candidate must produce a certificate from the Head of the Zoology Department of his College that he has completed in a satisfactory manner a practical course on the lines laid down from time to time by the Academic Council on the recommendation of the Board of Studies and that his laboratory journal has been properly kept. Every candidate must have recorded his observations directly in his laboratory journal. Every journal is to be signed periodically by a member of the laboratory staff. Candidates are to produce their laboratory journals and a series of not less than twenty-five preparations of animals or animal tissues for the microscope at the practical examination. Such journals may be taken into account by the Examiners in assigning marks.

The practical examination shall include (1) dissections and detailed zoological description and identification of the animals prescribed above, (2) preparation and identification of sections of animals and their structure under the microscope prescribed above, and (3) a knowledge of microtechnique including fixing, staining a section, cutting, etc.

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(6)—GEOLOGY.

As a Subsidiary Subject.

(Two Papers and two Practical Examinations.)

Paper I.—(a) Physical Geography, (b) Crystallography, Mineralogy and Petrology, (c) Physical Geology.

Paper II.—(d) Structural Geology, (e) Stratigraphy and Palaeontology, (f) Indian Geology.

PAPER I

(a) Physical Geography.—The Earth as a planet. Position of the Earth in the solar system. Form, size and motions of the Earth. Effects of revolution and rotation. The atmosphere; its composition, height, pressure, temperature and moisture; its movement and general phenomena in relation to climate. Fog and clouds. Rain, snow and hail. Frost and ice. The climates of India. The

distribution of land and water. The sea and the tides. Ocean currents. Mountain building and valley carving. Rivers, lakes and springs. Sub-aerial or exterior agencies: atmospheric, aqueous, organic and chemical; winds and gases of the atmosphere. Weathering, erosion and denudation. Rain water. Underground water. Work of rivers and streams. Work of ice. Glaciers. Subterranean or internal agencies. The interior of the Earth and the phenomena connected with its internal heat. Volcanoes. Geysers. Earthquakes. Elevation and depression of land.

- (b) Crystallography, Mineralogy and Petrology.—Principles of Crystallography. The Crystal systems. Crystallographic axes. Law of Symmetry. Twinning. Classification of rocks: igneous, sedimentary and metamorphic rocks. Agents of metamorphism. Local and Regional metamorphism. Important Indian ores: coal, mica, bauxite, iron, manganese.
- (c) Physical Geology.—The atmosphere, hydrosphere and litheosphere. Hypogene actions. Volcanoes and volcanic actions. Earthquakes. Secular upheaval and subsidence. Epigene actions. Denudation and deposition. Geological action of plants and animals.

PAPER II

- (d) Structural Geology.—Stratification. Joints. Inclination of rocks, Curvature. Cleavage. Dislocation of rocks. Unconformity. Eruptive and intrusive rocks. Mineral veins: their origin, structure and contents. Decomposition and recomposition.
- (e) Stratigraphy and Palaentology.—General principles of Stratigraphy. Table of stratified formations. Classification of the rocks of the Earth's crust. The general characters of the rocks, minerals and fossils of the Primary, Secondary and Tertiary rocks. Conditions of the entombment and preservation of organic remains, both on land and in water. Fossilisation. Uses of fossils in Geology. Rules of nomenclature. Fossils as indicative of stratigraphical order. Relative palæontological value of organic remains. Broad features of life of different geological periods, epochs and systems.
- (f) Indian Geology.—The geology of the Crystalline and Metamorphic rocks of Peninsular India. The Gondwana system. The Deccan and Malwa traps. Tertiary deposits in the Peninsula. The geological history generally of the Indian Peninsula.

Practical, Laboratory and Field work. (1) Identification of important minerals and rocks and typical fossils. (2) Notes on blowpipe analyses of twelve typical minerals. (3) Drawings of at least fifteen typical, simple crystal forms to cover all the crystallographic systems, except the Triclinic. (4) Entry into proper journals of the description of twenty hand specimens and slides of typical rocks, with drawings of at least six of these slides. (5) Preparation of the geological map of India. (6) Interpretation of geological maps; and drawings of at least four geological sections. (7) the drawings of at least thirty typical fossils representative of different systems.

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Excursion or excursions to any place of geological interest under the guidance of a member of the staff. Students shall keep notes of the observations made in the field.

Practical Examination.

Each candidate must produce a certificate from the Head of the Department of his College that he has completed in a satisfactory manner a practical course on the lines laid down from time to time by the Academic Council on the recommendation of the Board of Studies and that his laboratory journal has been properly kept. Every candidate must have recorded his observations directly in his laboratory journal and written therein a report on each exercise performed. Every journal is to be signed periodically by a member of the laboratory staff. Candidates are to produces their laboratory journals and field notes at the practical examination.

The practical Examination shall consist of an examination of the laboratory and field-work of the student and the identification of specimens of typical minerals, rocks and fossils as shown by his journal. The laboratory journal and field notes will be considered in assigning marks at the time of the practical examination. *Fifteen* marks will be assigned to journals and orals on journal work (*viva-voce*).

As a Principal Subject.

Four papers and four practical examinations.

Paper I.—(a) Physical Geology, (b) Structural Geology.

Paper II.—(c) Crystallography and Mineralogy, (d) Petrology.

Paper III.—(e) Stratigraphy and Palaeontology, (f) Ore Deposits

Paper IV.—(g) Indian Geology.

PAPER I

- (a) Physical Geology.—The atmosphere, hydrosphere, lithosphere, pyrosphere and centrosphere. The atmosphere as a geological agent. Light and temperature. Wind erosion and transportation. Aeolian deposits. Oceans, lakes and rivers. The drainage bassins of rivers. Geological work of rivers. Underground water. Zones of weathering and cementation. Sea as a geological agent. Terrigenous deposits. Continental shell. Littoral, pelagic and abyssal deposits. Glaciers and icesheets. Glacial deposits and glaciation. Organic agencies. Biogenic rocks. Coral reefs. Atolls and theories of the formation of an Atoll. Man as a geological agent. Sculpturing of the lithosphere. Weathering and erosion. Denudation and deposition. Theories of the conditions of the interior of the Earth. Evolution and the age of the Earth. Volcanic activities. Structure of volcanoes. Distribution of volcanoes. Geysers; their origin and the mineral deposits formed by them. Crust creep. Earthquakes. Seismographs. Epeirogenic and orogenic movements.
- (b) Structural Geology.—Stratification. Types of stratification. False cross-beddings. Surface markings. Unconformity and overlap. Fracture of rocks. Joints and cleavage of rocks. Inclination of rocks. Folding. Faults; their classification, origin and detection. Eruptive rocks: plutonic, intrusive and contemporaneous.

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PAPER II

- (c) Crystallography and Mineralogy.—The principles of crystallography. Crystal individual and crystal aggregate. Crystal systems. Axes of symmetry and axes of crystallography. Eleven types of crystal symmetry. Systems of crystal notation: the Parameter system of Weiss and the Index system of Miller (modified by Bravais). Zonal character. Twinned and pseudo-symmetric crystals and their formation. Parting planes, percussion figures and etched figures. Use of a contact goniometer. Physical properties characteristic of crystals. Biaxial and uniaxial crystals. Important rock forming minerals. Optical properties of minerals: axes of extinction; angles of extinction; pleochroism and polarisation colours. Thermal and magnetic properties of minerals. Physical, chemical and pyrogenetic characters of minerals. Water of crystallisation. Occluded water.
- (d) Petrology.—Magascopic and microscopic examination of rocks. Structure, composition, state of aggregation, colour and lustre, feel and smell, specific gravity and magnetism of rocks. Classification of rocks. Sedimentary, Igneous and Metomorphic rocks. Marbles and limestones. Effects of heat, heated water, compression, tension and fracture on rocks, Metamorphism of rocks. Induration of rocks. Kinds of metamorphism. The glassy and porphyritic, rocks. Calcareous, siliceous, phosphatic, glauconitic, carbonaceous and ferruginous rocks. Intrusive rocks: their effects on contiguous rocks.

PAPER III

- (e) Stratigraphy and Palaeontology.—Principles of Stratigraphy. Correlation of geological formations of the British Isles and India. Groups, life, periods and systems. Lithology and characteristic fossils of the rocks of the different systems. Scenic and economic aspects. Physical geography and vulcanicity during the different periods and systems. Orogenic and epeirogenic upheavals. Conditions for the entombment and preservation of organic remains on land and in sea. Fossilisation. Uses of fossils in Geology. Relative palaeontological value of organic remains. Imperfection of geological records. Classification, distribution and range of fossils. Orders, genera and species. The bearing of palaeontological data upon evolution. Morphological characters of typical fossils. Zone fossils and their use. Appearance of new types and extinction of old types.
- (f) Ore Deposits.—Magmatic Differentiation: Segregation of native metals, metallic oxides and sulphides. Pneumatolysis. Hydatogenesis. Metasomasis. Metamorphic ore deposits. Solution ores. Bedded ores due to precipitation. Detrital and alluvial deposits. Primary and secondary deposits. Mineral veins and Lodes: their origin, structure and contents. Successive infilling. Connection with faults and cross-veins. Relation of contents to surrounding rocks. Stocks and stock-works. Secondary minerals. Metamorphic minerals and minerals of commercial value. Mineral transformations. Specific gravity apparatus.

PAPER IV

(g) Indian Geology.—The physical geography and the geological history of the Indian Peninsula. Peninsular area. Indo-Gangetic plain. Extrapeninsular area excluding Burma. The correlation of Indian and English formations. The geology, petrology and distribution of Archaean, Purana, Dravidian and Aryan groups of rocks. Crystalline complex and Metamorphic rocks. Eruptive and schistose gneisses. Archaean crust movements. Unfossiliferous and fossiliferous older Palaeozoic rocks of Peninsular and Extra-peninsular areas. Upper Palaeozoic crust movements. The Gondwana system. Homotaxis of the Gondwanas. The Deccan trap. Infra and intertrappeson beds. Tertiary crust movements. Tertiary rocks of the Extra-peninsular Yenangyaung and Prome beds of Burma. Siwaliks of the Sub-Himalayas. The age and origin of the Himalayas. The Western Ghats. General character, composition, origin, distribution, mode of occurrence and the age of Laterite. Recent alluvial deposits. Porbandur stone. Desert sand and the older alluvium of the Narbada and the Godavari. The chief metalliferous ores of India; their distribution, occurrence and commercial value. Petroleum and mineral oil. Building stones and precious stones.

Practical Laboratory work.—(1) Acquaintance with the method of preparation of petrological slides. (2) Entry into proper journals of the description of thirty hand specimens and slides of typical rocks with drawings of at least fifteen of these slides. (3) Drawings of at least twenty-five typical and characteristic crystal forms to cover the six systems of crystallography. (4) At least six drawings or sketches of crystal aggregates showing important modes of occurrence and association of minerals in nature. (5) Notes on blowpipe analyses of twenty minerals. (6) Preparation of the geological map of India. (7) Students should be able to interpret and draw geological maps and sections; and drawings of at least ten geological sections. (8) The drawing or sketches of at least fifty typical fossills representative of different systems. (9) Identification of important, characteristic minerals and rocks and typical fossils. (10) students should be acquainted with the construction and use of a petrological microscope.

Field work.—Excursion or excursions to any place or places of geological interest under the guidance of a member of the staff. The aggregate time spent on the excursions shall not be less than seven days during the course. Students shall keep a full journal of the work done in the field, including a sketch map with the requisite sections diagrams etc. Students are expected to be conversant with local geology.

Each candidate must produce a certificate from the Head of the Department of his College that he has completed in satisfactory manner a practical course on the lines laid down from time to time by the Academic Council on the recommendation of the Board of Studies and that his laboratory journal has been properly kept. Every candidate must have recorded his observations directly in his laboratory journal and written therein a report on each exercise performed. Every journal is to be signed periodically by a member of the laboratory staff.

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Candidates are to produce their laboratory journals and field notes at the practical examination.

The practical examination shall consist of an examination on the laboratory and field-work of the students and the identification of specimens of important minerals and rocks and typical fossils, as shown by his journal. The laboratory journal and field notes will be considered in assigning marks at the time of the practical examination. Twenty-five marks be assigned to journals and orals on journal work.

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(7).—ANIMAL PHYSIOLOGY.

As a Subsidiary Subject

(Two Papers and two Practical Examinations.)

Chemical composition of the animal body. Physiology of the cell. Histology of animal tissues. Physiology of movement, General physiology of muscle and nerve. Foods and skeleton. Digestion, absorption and nutrition. The blood, the dietetics. lymph and tissue fluids. Physiology of the heart and blood vessels. Respiration. Excretion. External and internal secretions. Metabolism. Central and peripheral organs of the nervous system, including their origin and development. The spinal cord. The brain. nerves. Autonomic nervous system. Phonation, articulate speech. Senses of touch, taste and smell. Sense of sight and hearing. Sensations of moment and position. Labyrinthine sensations. Immunity. Physiology of sleep. The skin. The animal heat, Reproduction. Heredity.

General Physiology.—Protoplasm, its structure and properties Energetics, Surface action, including surface tension, surface energy, electric charge, absorption, molecular structure of interfaces. The colloidal state. Permeability of membranes and properties of surface of cell. Osmotic pressure. Electrolytes and their action. Functions and properties of water. Catalysis and enzymes. Secretion and digestion. Excitation and inhibition. Receptor organs. Tonus. Oxidation and reduction. The action of light. Electrical changes in tissues. Hormones.

Candidates should have undergone a course of practical instruction in Histology, Physiological Chemistry and Experimental Physiology. Each candidate must produce his laboratory note-books and journals duly certified by his teacher as a faithful record of actual work done by him.

The practical examinations will include examination in Histology, Physiological Chemistry and Experimental Physiology as well as a viva voce examination.

As a Principal Subject.

(Three Papers, three Practical Examinations and an Oral Examination with reference to the special branch of the subject selected by the candidate.)

Details of the theoretical and practical courses will be specified from time to time by the Academic Council on the recommendation of the Board of Studies.

A fuller knowledge of the above (Subsidiary) syllabus in all its branches. Candidates for the Final B. Sc. Examination in Physiology will be required—

- 1. To show a sound knowledge of Animal Physiology, both General and Special.
- 2. To have undergone the following course in Practical Physiology:—
 - (a) Special methods in advanced Histology.

(b) Advanced Physiological Chemistry.

- (c) Advanced methods of Experimental investigation.
- 3. In addition to the above, the candidate must specialise in one of the following branches of this subject or submit a thesis on the special work done, together with preparations, etc:—

(a) Physiological Chemistry.

(b) Digestion and metabolism, including internal secretions.

(c) Circulation and respiration.

(d) Neuromuscular system.

(e) Special senses and Experimental Psychology.

(f) Histology and Embryology from the Physiological aspect. Examination will consist of—

(1) Written papers—three.

(2) Practical Examinations—three.

(3) Oral Examination with reference to the special branch of the subject selected by the candidate.

R. 101.

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(8)—MICROBIOLOGY.

As a Subsidiary Subject.

(Two Papers, two Practical Examinations and an Oral Examination.)

A—I.—Micro-organisms and their position in nature—their classification and distribution—parasites and saprophytes—aerobic and anaerobic cultivation—conditions of growth—structure and physiology of micro-organisms—filtrable and ultramicroscopic organisms.

II.—Applied Microbiology:

(a) Microbiology of air.

(b) do. of water. (c) do. of soil an

(c) do. of soil and agriculture.

(d) do. of sewage and sewage disposal.
(e) do. of milk and milk products.

(f) do. of food and microbial poisoning.

(g) do. of alcoholic fermentation and derived products.

(h) do. of special industries.
 (i) do. of diseases of plants.

(1) do. of diseases of men and domestic animals.

Chap. XXXIV] B. Sc. : SYLLABUS IN MICROBIOLOGY

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B.—The student must have a working knowledge of microscopy and general laboratory technique and must produce evidence of having worked in a laboratory for at least six months.

The examination will consist of-

(1) Written papers—two.

(2) Practical examinations—two.

(3) An oral examination.

As a Principal Subject.

(Three Papers, three Practical Examinations and an Oral Examination.)

Details of the theoretical and practical courses will be specified from time to time by the Academic Council on the recommendation of the Board of Studies.

A .- I .- Classification and relationship of micro-organisms :-

- (a) General:—
 Microbial cytology.
- (b) Special:-
 - (i) Protozoa.
 - (ii) Fungi.
 - (iii) Bacteria.
 - (iv) Intermediate forms between Fungi and Bacteria proper.
 - (v) Ultra-microscopic organisms.

II .- Physiology of micro-organisms.

- (a) Physical forces involved in biological activities:—
 Energy—moisture—temperature—electrical conductivity
 —ionisation and dissociation—hydrogen-ion concentration—surface—tension—absorption—diffusion—osmosis-dialysis.
- (b) Chemical factors determining stimulation and inhibition of growth.
- (c) Chemical composition of micro-organisms.
- (d) Nutrition and metabolism.

 Food of micro-organisms—products and results of microbial activity. Metabolic processes in micro-organisms—certain inherent factors influencing these-processes—micro-organisms and the rotation of elements in nature, viz., carbon cycle, nitrogen cycle, sulphur-cycle and phosphorus cycle.
- (e) Auto-trophic—micro-organisms—saprophytes—parasite—symbions.

III .- Applied Microbiology :-

- 1. Suitable for Medical Students :-
 - (a) Microbiology of air—microbial air influence in diseases of men and animals—dust infections—droplet infections

- (b) Microbiology of water—interpretation of the bacteriological analysis of water—water in relation to infectious diseases. Filters.
- (c) Microbiology of sewage—effects of bacterial treatment on pathogenic organism—Septic tank system—activated sludge process.
- (d) Microbiology of soil—relation of soil to bacterial diseases.
- (e) Microbiology of milk—micro-organisms which are beneficial and detrimental to health—milk as a carrier of disease organisms.
- (f) Microbiology of milk products—pathogenic bacteria in butter—poisonous cheese.
- (g) Microbiology of food—microbial food poisoning.
- (h) Microbiology of the digestive and respiratory tracts—micro-organisms of the faeces.
- (i) Micro-organisms in relation to diseases of men—diseases caused by moulds and yeasts—diseases caused by protozoa and spiral organisms—diseases of unknown etiology.
- (i) Infection and immunity—manufacture of vaccines, antisera, tuberculins—control of infectous diseases.

2. Suitable for Chemistry Students :-

- (a) Microbiology of air: microbial air influence in fermentation, putrefaction and decay.
- (b) Microbiology of water: interpretation of the bacteriological analysis of water—purification by ozone and by chemicals.
- (c) Microbiology of sewage: putrefactive and anaerobic bacteria—oxidising bacteria—destruction of sewage bacteria—by chemical precesses.
- (d) Microbiology of soil: decomposition of organic matter in the soil—fixation of atmospheric nitrogen—changes in inorganic constituents.
- (e) Microbiology of milk: normal development of micro-organisms in milk—butyric acid fermentation—abnormal fermentations.
- (f) Microbiology of milk products: decomposition processes in butter—normal and abnormal ripening of cheese—fermented milk beverages.
- (y) Microbiology of food: fermented foods—bacterial infection of food—chemical nature of food poisons preservation of food by chemicals.
- (h) Microbiology of alcoholic fermentation: lactic, butyric, citric fermentations.
- (i) Microbiology of alcoholic products: alcoholic beverages—acetic fermentation.

- (i) Fermentation cocoa, coffee, tea, indigo, tobacco opium—manufacture of starch—retting—tanning,
- 3. Suitable for Agricultural Students:-
 - (a) Microbiology of air: microbial air influence in diseases of men and animals—dust infections—droplet infections.
 - (b) Microbiology of water: interpretation of the bacteriological analysis of water—water in relation to infectious diseases. Filters.
 - (c) Micro-organisms in relation to soil and agriculture:—
 - Number and distribution of bacteria in the soil—distribution at different depths—ammonifying, nitrifying, denitrifying and nitrogen fixing bacteria, seasonal variation of bacterial activity, aerobic and anaerobic—rate of oxidation of carbon, hydrogen, suphur, and nitrogen—mineralisation of organic matter—production and assimilation of plant-food—changes in inorganic constituents of soil.
 - (d) Microbiology of the manure pile, green manure.
 - (e) Micro-organisms in relation to sewage disposal—septic tank system—activated sludge process.
 - (f) Micro-organisms in relation to milk and milk products—sources of micro-organisms in milk—types of organisms found in milk—milk as a carrier of disease producing organisms. Butter—ripening of cream and its control—use of pure culture in butter making. Cheese—types of cheese—curdling of milk—manipulation of curd—ripening of cheese—causes of proteolysis, prevention of putrefaction. Other home and dairy products—curds—buttermilk—condensed milk—evaporated milk—concentrated milk—powdered milk—ice-cream—special milk drinks made by the action of micro-organisms.
 - (g) Micro-organisms in relation to-
 - Food and food preservation—dessiccation—evaporation and drying of foods—preservation of food by cold, by heat, by chemicals—fermented foods—bread—malt—syrups—starch—sugar—tea—silage.
 - (h) Microbiology of special industries—indigo—retting—tobacco and vinegar.
 - (i) Microbial diseases of plants—blights—galls and tumours—leaf spots—rots—wilts—their control.
 - (i) Microbial diseases of insects—flacheri pebrine—foul brood, black brood, sac brood, locust epizootic, septicaemia of the cockchafer—graphitosis.

- B.—The student must submit a laboratory diary showing that he has done practical work for at least three terms in a laboratory in :—
 - (a) the preparation of various culture media;
 - (b) the practical study of micro-organisms, critical microscopy, biometry and serological methods;
 - c) the bacteriological examination of the materials studied.

The examination will consist of :-

- (1) Written papers—three. One paper to be on group selected under A-III.
- (2) Practical examinations—three.
- (3) An oral examination with special reference to the group selected under A-III.

R. 102.

(9)—Comparative Anatomy and Embryology.

As a Subsidiary Subject

(Two Papers, two Practical Examinations and an Oral Examination.)

Human Anatomy.

Bones, Joints, Muscles, Nervous System (including the organs of special sense), Vascular, Respiratory, Digestive and Urogenital systems, Ductless glands. Regional Anatomy of the head, the neck, the throat, the abdomen and extremities. Surface Anatomy.

Embryology.

Germ cells, their origin and structure; Maturation and fertilization, Segmentation; Germinal Layers, Early stages of the Chick, Principles of Organic Evolution. Feetal membranes and Placenta.

Practical Work.

Each candidate shall produce a certificate from the Head of the Department of Anatomy that he has carried out in a satisfactory manner the dissection of the entire human body for three medical terms and has done practical work in Embryology and Cytology for a period of one medical term.

The practical work in Embryology and Cytology comprises:—

Microscopic technique including fixing, staining, section cutting and mounting of specimens.

The development of the chick upto the end of the third day of incubation.

The study of Cell, Mitosis, Meiosis and Fertilization.

The examination shall consist of—

Paper I.—Human Anatomy.
Paper II.—Embryology, Cytology and the Principles of
Organic Evolution.

Two practical examinations and an oral examination.

Chap. XXXIV] B. SC.: SYLLABUS IN EXPERI. PSYCHOLOGY

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As a Principal Subject

(Four Papers and four Practical Examinations.)

A fuller knowledge of the above (Subsidiary) syllabus in all its branches, and in addition the following:—

(1) Anatomy of the human feetus.

(2) Principles of Morphology comprising-

(a) Vertebrate Embryology, including Cytology as illustrated by the development of—
 —Amphioxus Frog, Chick and Rabbit.

(b) Comparative Anatomy of the vertebrates as illustrated by—Amphioxus Fish, (Dog Fish), Frog, Lizard, Pigeon, Rabbit or Guinea pig.

(3) Principles of Organic Evolution.

Practical Work.

Each candidate shall produce a certificate from the Head of the Department of Anatomy that he has carried out in a satisfactory manner the dissection of the entire human body and has done practical work on the remaining parts of the syllabus including an intensive study of the development of the chick up to the end of the fourth day for a period of three medical terms.

(Four Papers in the following order).

Paper I .- Human Anatomy.

Paper II.—The Comparative Anatomy of the Vertebrates. The Principles of Organic Evolution.

Paper III.—Embryology and Cytology.

Paper IV.—Essay.

(Four Practical Examinations.)

- 1. Human Anatomy.
- 2. Comparative Anatomy.
- 3. Cytology and Embryology of vertebrates.
- 4. Viva voce and general microscopic technique.

Details of the theoretical and practical courses will be specified from time to time by the Academic Council on the recommendation of the Board of Studies.

R. 103.

(10).—Experimental Psychology.

As a Subsidiary Subject

(Two Papers and two Practical Examinations.)

As a Principal Subject

(Three Papers and three Practical Examinations.)

Details of the theoretical and practical courses will be specified from time to time by the Academic Council on the recommendation of the Board of Studies.

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R. 104.

Standard for Passing the Examination.

EXAMINATIONS

To pass the examination a candidate must obtain in each subject thirty-three per cent marks separately in the papers taken together, and in the practical examinations taken together, or in Mathematics in all the papers taken together. Should a candidate fail in either the practical or written examination in the Subsidiary subject only, he may be declared, by a majority of not less than two-thirds of the Examiners present at the final meeting, to have passed the Examination, provided he obtains at least forty per cent. of the total marks in his Principal subject. Those of the successful candidates who obtain forty per cent. of the total marks in the Subsidiary subject and forty-eight per cent. of the total marks in the Principal subject will be placed in the Second Class. Those of the successful candidates who obtain forty-five per cent. of the total marks in the Subsidiary subject and sixty per cent. of the total marks in the Principal subject will be placed in the First Class. Also those of the successful candidates who obtain forty-eight per cent. of the total marks in the Subsidiary and Principal subjects taken together will be placed in the Second Class, provided they obtain at least forty-five per cent. in the Principal subject, and those who obtain sixty per cent. of the total marks in the Subsidiary and Principal subjects taken together will be placed in the First Class, provided they obtain fifty-five per cent. at least in the Principal subject. Of the candidates placed in the First Class, those who obtain sixty-six per cent. marks or more in the Principal subject will be declared to have passed with distinction in that subject.

R. 105.

A candidate who secures forty-four per cent. of the total marks in his Principal subject at any one examination may, at his option, be excused from appearing again in that subject (provided he has obtained the minima in the papers and in the practicals required by Regulation 104), and will be eligible for the B. Sc. degree by qualifying in accordance with Regulation 104 in the Subsidiary subject at a subsequent examination. A candidate who passes his B. Sc. Examination in this way will not be eligible for a class, prize or scholarship awarded at the examination. The Subsidiary subject mentioned herein shall be held also to mean the Honours subject taken by a Bachelor of Arts with Honours in a Science group and from which he claims exemption while appearing for the B. Sc. Examination.

R. 106.

A candidate who has passed either the Intermediate M.B.,B.S. or the First M.B.,B.S. Examination of this University, shall be deemed to have passed the Subsidiary examination at his option either in Comparative Anatomy and Embryology or Animal Physiology for the B. Sc. Degree, provided that in the case of Comparative Anatomy and Embryology he shall produce a certificate from the Head of a College affiliated to this University for the B. Sc. Degree that he has done practical laboratory work in Embryology and Cytology for a period of one medical term.

R. 107.

A candidate securing exemption from the subsidiary examination in Comparative Anatomy and Embryology or Animal Physiology

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M. SC. : ADMISSION

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according to Regulation 106, shall be required to keep three medical terms after the Intermediate M. B., B. S. or the First M. B., B. S. Examination before being allowed to sit for the B. Sc. Examination with Comparative Anatomy and Embryology or Animal Physiology as his principal subject. These terms shall not count for the M. B., B. S. Degrees.

R. 107A.

A candidate securing exemption from the Subsidiary subject for the B. Sc. Degree according to Regulation 106 who wishes to take as his principal subject a subject other than Comparative Anatomy and Embryology or Animal Physiology, may do so, provided he has undergone the prescribed course of instruction for the same, for a period of four terms of the Faculty of Science.

(16)—MASTER OF SCIENCE.

Admission.

0. 227.

Any person who has passed the B. Sc. Examination of this University or the B. Sc. Examination of any other University recognized by this university which may be considered by the Academic Council equivalent to the B. Sc. Examination of this University not less than two academical years previously and who has formally received the B. Sc. degree and who has passed an examination in French or German as provided in Regulation 114 may be admitted* to the examination for the Degree of Master of Science, and should he pass the examination in any one of the branches he will be admitted to the Degree of M. Sc.

0. 227A.

On a new application being forwarded and fresh fee paid, a candidate who has already passed the examination for the M. Sc. degree may present himself again for the same on a subsequent occasion, subject to the following conditions:—

- (1) If he has passed in one branch he may appear in another branch.
- (2) If he has passed in one group of Mathematics he may appear in the other group.
- (3) If he has obtained his degree by submitting a thesis in lieu of the whole examination, he may appear by papers in the same or in any other branch or by thesis, in the other groups of the same branch or in any other branch.
- (4) If he has obtained his degree by papers, or partly by papers and partly by thesis, he may appear by submitting a thesis in lieu of the whole examination of the same branch or in any other branch whenever it is allowed by regulations.

A candidate who thus re-appears in accordance with any of the rules above stated shall be entitled to receive the degree and will be eligible for a class but not for University awards in the new branch or in the same branch, but with the new subject, provided always

Subject to the provisions of Ordinance 74 of the Hand-Book.

that no candidate will be allowed to re-appear in another branch or in other groups of the same branch, unless he has done work for at least two additional academic years or four additional terms, under a recognized University Teacher or Teachers prior or subsequent to his passing the M. Sc. examination on the first or the next preceding occasion as the case may be.

- R. 108. The M. Sc. Degree may be taken—
 - (1) by research alone;
 - (2) by written examination and practical (where possible).
- R. 109. The candidate shall submit a certificate signed by the teacher under whom he has worked stating that there is a prima facie case for the consideration of the thesis. Such certificate shall be regarded as satisfying the Board of Studies that the candidate has done sufficient work to enable him to appear for the examination.
- R. 110. Theses may be submitted at any time during the year. A candidate shall give notice of his intention to submit his thesis at least two months before the date on which he intends to submit the same. In such notice the candidate shall state the title of the thesis and the name of the University Professors, University Teacher or other recognized Teacher under whom he has worked, and he shall also indicate generally the nature of the results of his work. The candidate shall forward his thesis to the Registrar through his University Professor or University Teacher along with his form of application for admission to the examination and a fee of Rs. 100.
- R. 110A. The Academic Council having before it the suggestion or suggestions of the appropriate Board of Studies, shall recommend to the Syndicate the names of suitable referees, none of whom shall be the University Professor or Teacher who has guided the candidate's work. When the Syndicate has appointed a referee, the Registrar shall forward the thesis to him. The referee shall consult the University Professor or Teacher who has guided the student's work and shall report to the University whether the thesis shall be accepted or rejected. The report of the referee shall be final. Every such report shall be circulated to the members of the relevant Board of Studies and placed before the Academic Council for information.
- R. 110B. A thesis that has been rejected may be submitted again after due revision and subject to the provisions of Ordinance 227 and Ordinance 227A.
- R. 111. A candidate shall submit five copies of the text of his thesis (with one set of preparations and diagrams, if any) together with a synopsis and a statement indicating to what extent his work is original, and to what extent it is borrowed from others. The thesis shall be the candidate's own work carried out under the guidance or supervision of his Teacher.
- R. 111A. A candidate for the M.Sc. Examination in Animal Physiology will be expected to show a general knowledge of Physiology in all its branches. In addition, he shall furnish evidence of having been

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engaged on some special subject or branch of Physiology, which he shall specify by notice in writing to the Registrar two months before the date on which he intends to submit his thesis. He may submit a thesis, a series of preparations or any other evidence of his work, and the Examiners shall take such evidence into consideration in assigning him marks at the examination.

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The practical examination will occupy at least three days. Examiners are at liberty to apply any test they think desirable either viva voce, by writing or by experimental work, in order to obtain evidence as to the knowledge the candidate possesses.

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R. 112.

The examination will comprise the following branches:-

- 1. Mathematics.
- 2. Physics.
- 3. Chemistry,
- 4. Botany,
- 5. Zoology (including Comparative Anatomy and Embryology),
- 6. Geology,
- 7. Animal Physiology,
- 8. Microbiology,

R. 113.

Each candidate for the Examination shall be required to show, in addition to a general acquaintance with the whole of one of the subjects named in Regulation 112 (except Mathematics), a special acquaintance with some one branch thereof.

R. 114.

- (1) A candidate for the M. Sc. Degree by research shall first pass a language Test in French or German and shall submit his thesis not less than two terms after passing the Language Test and not less than four terms after passing the B. Sc. Examination. The Language Examination may by taken at any time after passing the Intermediate Science Examination or the B. A. Examination with Science.
- (2) The Language Examination Paper shall be of two hours' duration, and shall consist of a passage or passages for translation into English. The passage or passages shall be connected with the branch of science offered by the candidate. Alternative passages pertaining to the different branches of science shall be set to the candidates and shall deal with subjects of which some knowledge is to be expected from B. Sc. graduates. The use of a dictionary shall be allowed in answering the paper.

R. 115.

On the recommendation of the Board of Studies, the Academic Council may from time to time prescribe or recommend text-books in the various subjects of this examination and modify from time to time as may be found necessary, the details of the theoretical and practical courses laid down for this examination.

Syllabus.

R. 116.

(1).—MATHEMATICS.

[N. B.—If a candidate has passed his M. A. Examination in one of the Mathematics groups A or B, he will have to appear for the other group to qualify for the degree of M. Sc.]

[The course and syllabus are the same as those of the M. A. Examination.]

R. 117.

(2).—PHYSICS.

(Four Papers and four Practical Examinations of not more than three hours each.)

In sending in his application to the Registrar, each candidate is to enclose a full account of the course of reading and of practical work he has completed, and lectures he has attended since passing the examination for the Degree of Bachelor of Science.

The grouping of papers will be as follows:-

Paper I.—General and Mathematical Physics.

Papers II and III.—Modern Physics, embracing important recent work in all branches of Physics.

Paper IV.—On a branch of Physics selected by the candidate-from the following list:—

(1) Advanced Heat and Thermo-dynamics.

(2) Physical Optics and Sound.

(3) Electricity and Magnetism, Electron and Molecular Theory.

(4) Radiation and Spectroscopy.

(5) Physics of the Earth and the Atmosphere and Radioactivity.

The scope of these subjects will be indicated by books to be recommended by the Academic Council on the recommendation of the Board of Studies.

Practical Examination.

Candidates for the M. Sc. Degree in Physics should take up any twenty experiments of the type of the experiments given in the following list, the majority of which should be on the subject in which the candidate desires to specialize himself in Paper IV:—

List of Experiments.

- 1. Determination of the absolute frequency of a tuning fork or A. C. using the Phonic wheel.
- 2. surface tension by capillary ripples (Rayleigh's Method).
- 3. " surface tension by bubbles (Gaeger's method).
- 4. Young's modulus by Newton's ring's (Searle's method).

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5.	Determination of Poisson's ratio (Street 1.1.
6.	Determination of Poisson's ratio (Strauble's method). "Viscosity of fluids by using coaxial cylinders."
7.	Construction, calibration and use of a resistance thermometer.
8.	of a thermo-couple.
9.	Determination of the radiation constant δ in $R=\delta$. T ⁴ .
10.	vapour density (Hoffmann's method).
11.	,, vapour density (Victor Meyer's method).
12.	specific heat (Bunsen's ice calorimeter).
13.	" molecular weight. (Beckmann's freezing point method).
14.	" molecular weight (Beckmann's boiling point method).
15.	Construction, calibration and use of an Optical Pyrometer (Holborn & Kurlbaum).
16.	Determination of the calorific value of a substance (Thomson).
17.	,, thermal conductivity of a solid (Lee).
18.	" thermal conductivity of a solid (Angström).
19.	Setting up of a thermostat.
20.	Measurement of the angles of crystals. (Goniometer).
21.	Determination of the absorption of a coloured liquid and the determination of the extinction coefficient. (Nutting Photometer).
22.	Calibration and use of a Babinet's compensator.
23.	Use of a concave grating (Rowland mount).
24.	" " (Eagle mount).
25.	" (P. T. R. or Paschen mount).
26.	Photographing spectra, identifying lines and using interpolation formula.
27.	Use of Michelson's Interferometer.
28.	" Lummer Plate Interferometer.
29.	" Echelon Interferometer.
30.	" Etalon Interferometer.
31.	Determination of the wave-length of X-ray.
32.	Taking and interpreting a simple Laune Photograph (X-Ray.)
33.	Taking and interpreting a reflection Photograph (X-Ray).
34.	Determination of the efficiency and brake H. P. of a motor.
35.	Ballistic galvanometer, its calibration and use.
36.	Use of a Bismuth spiral.
37.	Use of a search coil, its construction and calibration.
38.	Use of a solenoid- its construction and calibration.
39.	Determination of the impedance in A. C.
40.	" of the power factor in A. C.

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41.	Determination of the frequency of an A. C. (Stroboscope) or a vibrating string.
42.	Preparation of a standard Weston element and its calibration.
43.	Use of an electoscope; its calibration and use in radioactive measurements.
44.	Use of a quadrant electrometer, its calibration and use in radioactive measurements.
45.	Determination of 'e' by Millikan's method.
46.	" 'e/m' by Zeemann effect.
47.	" 'e/m' by Thomson's tube.
48.	"h" by photo-electrons.
49.	"N " Avogadro's number (Brownian movement.)
50.	" of the characteristics of crystals for radio receivers.
51.	of the characteristics of thermionic valves, amplification factor, impedance and mutual
	conductance.
52.	" (i) natural wave-length of an aerial, (ii) inductance (iii) capacity, (iv) resistance.
53.	Setting up a radio-frequency oscillator and calibration of the same with a wave-meter.
54.	" receiver.
55.	" valve-voltmeter.
56.	Determination of the type of a resonance circuit.
57.	" (i) inductance, (ii) capacities, (iii) resistance at R. F.
58.	Setting up of an amplifier (i) audio frequency (ii) radio frequency.
	(3)—CHEMISTRY.
follov	The M. Sc. Degree in Chemistry may be obtained in one of the ring branches:—
	I. Inorganic Chemistry. II. Organic Chemistry. III. Physical Chemistry.
the l	There will be 4 papers and at least 4 days' practical examination in branches selected by the candidates.
Stud each	The Academic Council on the recommendation of the Board of ies in Chemistry may specify additional subjects in paper IV in of the above branches. If a candidate wants to offer a subject not tioned in paper IV in any of the above branches he can do so offer

I-Inorganic Chemistry.

mentioned in paper IV in any of the above branches he can do so after obtaining a permission of the Board of Studies in Chemistry at least

Theoretical Examination.

Paper I-Systematic Inorganic Chemistry.

one year before the date of the examination.

R. 118,

The subject as for B. Sc (Principal Inorganic Chemistry) treated in a more advanced manner as also (a) a general study of

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inert gases and of the following elements and their compounds: rubidium, caesium, berylium, gallium, indium thallium, scandium, rare earth metals, titanium, Zirconium, hafnium, germanium vanadium, columbium, tantalum, molybdenum, tungsten, palladium, platinum group metals and radio active elements.

(b) relation between the members of each group in the periodic classification in terms of the electronic theory of valency.

Paper II—(a) Historical development of Inorganic Chemistry.

- (b) Recent investigations on :-
 - (1) new elements.
 - (2) determination of atomic weights.
 - (3) heavy hydrogen and heavy water.
 - (4) hydrides, carbides, nitrides and carbonyl compounds of metals.
 - (5) Compounds of hervilling
 - (6) Compounds of beryllium, germannium, nitrogen, phosphorus, selenium, Chromium, molybdenum, tungsten, fluorine, bromine and platinum, group elements.
 - (7) Univalency among metals of the 8th group.
 (8) Spatial configuration of compounds containing elements other than carbon.
 - (9) Artificial radio active substances.

A study of the annual reports on the progress of Chemistry (issued by the Chemical Society) for the last ten years is recommended.

Paper III—Industrial applications of inorganic Chemistry. A study of any three of the following from an industrial point of view:—
1. fuels; 2. water; 3. ozone, chlorine, bleaching powder and bleaching liquors; 4. glass; 5. ceramics; 6. artificial manures; 7. sulphur compounds; 8. aluminium and its compounds.

Paper IV-Special paper

Detailed study of any one of the following:— corrosion; ferrous and non-ferrous alloys; co-ordination compounds; silicates.

Practical Examination

Candidates will have to offer A and B or C:-

- A.
 (1) Preparation of compounds for which detailed instructions are available from the Literature.
 (2) Qualitative and quantitative analysis of mixtures containing small amount of some of the components.
- B. (3) Analysis of ores. (4) Analysis of alloys. (5) Gas analysis.
- C. (6) Food, Drugs, and Water analysis.

II-ORGANIC CHEMISTRY.

Theoretical Examination.

Paper I—The whole of systematic Organic Chemistry including aliphatic, carbocyclic and heterocyclic compounds.

Paper II—Recent work (for the past 10 years) in Organic Chemistry. The candidate will be expected to know the lines of advance in such fields as chlorophyll, plant pigments, porphyrines, vitamins, harmones and bile acids, electronic explanation of organic reactions, polymerisation as in the case of (rubber, cellulose, etc.), cyclic constitution of carbohydrates, etc.

Paper III-Industrial organic chemistry.

The candidates will be expected to know the methods of large scale work in industries such as the manufacture of dyes, drugs, explosives, plastics, artificial silk and those that involve the use of fermentation processes.

Paper IV—One of the undermentioned subjects to be selected as a special subject.:

- (a) Stereochemistry,
- (b) Alkaloids,
- (c) Carbohydrates,
- (d) Proteins,
- (e) Enzymes and related products,
- (f) Turpines and camphor,
- (g) Synthetic Drugs.

Practical Examination

- (i) Preparation of a moderately complex compound involving the use of the usual reactions and for which detailed instructions are available in literature.
- (ii) Separation and qualitative analysis of mixtures of compounds, not more than 3 ingredients to be given, and each ingredient not to contain more than 2 active groups.
- (iii) Quantitative analysis of organic compounds including estimation of elements and groups as well as the estimation of ingredients in mixtures of moderate complexity.

III-PHYSICAL CHEMISTRY.

Theoretical Examination

Paper I-General Paper

General knowledge of a more advanced nature than that prescribed for the B. Sc. examination, on the following subjects:

Physical properties of elements and compounds, phase rule, kinetics of reactions, solutions, colloids, radioactivity, valency and structure of atom, X-rays and structure of crystals, photochemistry, intensive drying.

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Paper II-Recent advances in Physical Chemistry.

Recent work on subjects such as chemical kinetics, magnetism in chemistry, chemistry of surfaces, theories of solution, electronic theory of valency, X-rays.

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These subjects are well discussed in the Annual Reports of the Chemical Society and the Transactions of the Faraday Society for the past ten years.

Paper III-Industrial aspects of Physical Chemistry.

The Physico-chemical principles involved (i) in the manufacture of fine and heavy chemicals, soaps, cellulose and rubber, (ii) in dyeing and printing, tanning, photography and photosynthesis and electroplating.

Paper IV-Special Paper.

Detailed and extensive information on one of the following subjects:—

- 1. Colloid Chemistry;
- 2. Photochemistry;
- 3. Electrochemistry;
- 4. Thermodynamics;
- 5. Structure of molecules.

Practical Examination

List of the experiments in Physical Chemistry

- Determination of the complexion formation by the following methods:
 - (a) cryoscopics,
 - (b) partition coefficient.
 - (c) electrical conductivity and
 - (d) E. M. F.
- 2. Hydrolysis of salts like aniline hydrochloride by the following methods:
 - (a) partition coefficient,
 - (b) electrical conductivity,
 - (c) E. M. F.
- 3. Solubility of sparingly soluble salts by the following methods:
 - (a) Electrical conductivity and
 - (b) E. M. F.
- 4. Determination of pH by (a) E. M. F., (b) electrical conductivity and (c) colorimetric measurements.
- 5. Comparison of the strengths of acids and bases by
 - (a) electric conductivity and
 - (b) thermochemical measurements.
- 6. Electrometric titration.
- Determination of the degree of dissociation of weak acids, and weak bases.

- 8. Determination of transport number of ions.
- 9. Determination of the vapour pressure of pure liquids and solutions.
- 10. Measurement of the absorption spectra of solutions.
- 11. Identifications of elements from their emission spectra.
- 12. Heats of hydration, solution, precipitation and ionisation.
- 13. Velocity of reactions.
- 14. Measurement of the charge on a colloidal particle,
- 15. Parachor determination.
- 16. Dipole moment determination.

R. 119.

(4).—BOTANY.*

(Three Papers and at least three days' Practical Examination.)

A candidate will be expected to show a general knowledge of Botany in all its branches. In addition he shall furnish evidence of having been engaged on some special subject or branch of Botany which he shall specify by notice in writing to the Registrar on or before the 14th of February. He may submit a thesis, a series of preparations or any other evidence of his work, and the Examiners shall take such evidence into consideration in assigning him marks at the examination.

The practical examination will occupy at least three days. Examiners are at liberty to apply any test they think desirable, either viva voce, by writing, or by experimental work, in order to obtain evidence as to the knowledge the candidate possesses.

A thorough command of the methods, instruments and apparatus utilized in botanical work will be demanded and a special familiarity with those used in connection with the special subject which the candidate offers.

(4A)—Botany (Revised Syllabus)†

(Four papers and four practical examinations)

Candidates may select any three out of the following five optional subjects and one out of the eight special subjects:

Optional Subjects

- (1) Comparative Morphology & Organography.
- (2) Physiology.
- (3) Taxonomy & Genetics.
- (4) Ecology & Plant Geography, and
- (5) Economic Botany.

†The first M. Sc. examination according to the revised syllabus in Botany will be held in 1940.

^{*}The last examination under the existing course in Botany will be held in

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.131.

Special Subjects

(1) Algae, (2) Fungi & Lichens, (3) Bryophta, (4) Pteridophyta, (5) Flowering Plants of the Bombay Presidency, (6) Fossil Botany, (7) Cytology, and (8) Vegetation of a special tract.

R. 120.

(5)—Zoology. (Three Papers and at least three days' Practical Examination.)

A candidate will be expected to show a general knowledge of Zoology in all its branches. In addition, he shall furnish evidence of having been engaged on some special subject or branch of Zoology which he shall specify by notice in writing to the Registrar on or before the 14th of February. He may submit a thesis, a series of preparations or any other evidence of his work, and the Examiners, shall take such evidence into consideration in assigning him marks at the examination.

R. 121.

(6)—Geology.*
(Four Papers and at least four days' Practical Examination.)

The examination for the degree will consist of a searching test in the whole subject as prescribed for the B. Sc. (Principal) Examination, much more fully treated. The student shall specialise besides in any one of the branches (a) to (f) or any restricted portion of any branch approved by the Board of Studies.

Examination for the Degree of Bachelor of Science (Agri.)

0. 228.

GENERAL.

A candidate for the Degree of Bachelor of Science (Agri.) must produce a certificate, signed by the Principal of an affiliated College, to the effect that he has satisfactorily carried out at such College the work appointed by the University for the First Year in Science after Matriculation, or must have passed an examination in a recognized University which is accepted as equivalent to the First Year Science Certificate Examination held by a College affiliated to this University.

Explanation :-

For the purpose of the above Ordinance, the Intermediate Science Examination of a Statutory Indian University or the University of Mysore shall be deemed equivalent to the First Year Science Examination of a college affiliated to this University.

0. 229.

A candidate will be required to pass three examinations, viz., the First and the Second Year Examinations in Science (Agri.) and the Examination for the Degree of Bachelor of Science (Agri).

(17)—FIRST YEAR EXAMINATION IN SCIENCE (AGRI.).

Admission.

0. 230.

No candidate will be admitted to this examination unless he produces satisfactory testimonials of having, subsequent to his receiving the certificate from the Principal of an affiliated College referred

*The revised syllabus in Geology will be found in the last chapter of the Handbook.

to in Ordinance 228, or subsequent to his passing an examination recognised by the University of Bombay as equivalent to the First Year Science Certificate Examination of a College affiliated to it, kept two terms in a college recognised in Agriculture by this University.

R. 122A.

The candidates will be examined in the following subjects:-

(1) Agriculture

(2) Chemistry

(3) Botany

(4) General Zoology

(5) Mathematics and Elementary Physics.

The following table indicates the sub-heads of each subject, their distribution by terms, the number of credits allowed to each sub-head, the number of papers, and the time allowed for each paper and the allotment of marks in the University Examination.

	Subjects		For T	eachin	g	For Examinations					
	and Sub-heads.	cre	dits	Second cre Lect.	dits	No. of Papers	anah	or Mark eac . Paper		otal	
(1)	Agriculture					2	2	75	150	300	
	Soils	1	1	2	1						
	Tillage & Tillage & Implements		2	2	2	1930G					
	Carpentry & Smithy	0	1	0	1						
	Crop Production	0	1	•••							
(2)	Chemistry	5	2	5	2	{1 1	2	75	:::}	250	
(3)	Botany	2	1	2	2	1	3 2	100 75	75 \ 50	125	
(4)	General Zoo- logy	2	1	2	1	1	2	75	50	125	
(5)	Mathematics & Physics Mathematics.		1	1	0	2	2	75	50	200	
	Physics	2	1	2	1						
(6)	Agri. Engineering.					T	To be examined in the second year				
	Surveying & Levelling	0	0	1	1						
	Total	15	11	15	11					925	

Note:—One credit means one lecture period or one period (two hours more or less) of practical work per week per term.

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R. 122B.

The Practical work done by each student during the year must be recorded in note books, which must be attested by the Principal of the College and presented to the examiners. In all cases candidates shall be examined orally or practically on the work recorded in their note-books.

R. 123.

On the recommendations of the Board of Studies, the Academic Council, may from time to time, prescribe text-books in the various subjects of this examination and modify from time to time, as may be found necessary, the details of the theoretical and practical courses laid down for this examination.

Syllabus.

R. 124A.

I.—AGRICULTURE.

(Two Papers and a Practical Examination.)

First Paper

1. Origin and formation of Soils.

The Earth's crust, its present condition and composition.

Soil forming minerals and rocks, their formation, classification and relation to soils.

Rocks and minerals of the Bombay Presidency.

Rock weathering and soil formation. Classification of soils in general and the Bombay Presidency in particular according to their origin.

2. Soil Physics.

Physical properties of soils:

(i) Texture as determined by the mechanical analysis of soil.

(ii) Structure: plasticity, cohesion, granulation, filth.

(iii) Colloids affecting soil properties.

(iv) Absolute and apparent specific gravity, pore space and weight of soils.

(v) Surface of the soil particles, the absorptive and retentive properties of soils for water and soluble menurial salts.

Relations of soils to water: types and source; effect of drying and wetting, shrinkage, cracking; effect of irrigation water; erosion; wilting co-efficient and moisture equivalent; surface tension; upward and lateral movement of water in soils.

Relation of soils to temperature: effect of incorporation of organic matter on soil temperature: relation between soil temperature and plant growth.

Relation of soils to air; aeration of soils; nature of gases produced under aerobic and anaerobic conditions.

Soil colloids.

Classification of the soils of the Bombay Presidency based on their physical properties.

Relation of soil classes to weather conditions or climate.

Second Paper

Tillage and tillage implements.

Importance and scope of Agriculture to other industries and sciences.

Tillage operations: ploughing, clod crushing, levelling, harrowing, smoothing, rolling, intercultivation including earthing and hilling up of crops. General effects of tillage operations.

The construction, assemblage, adjustment, working, action, cost, care and variations in tillage implements: ploughs, clod crushers, levellers, harrows, ridgers, broadcasters, seed drills, planters, hoes, cultivators and hand tools.

Practical Work.

- 1. Recognition of soil forming rocks and minerals and classes of soils of the Bombay Presidency.
- 2. The practical course in soil physics will include: a study of soil under field conditions; different types of soil samples; soil sampling; soil temperatures; size and structure of soil particles; volume, specific gravity and pore space; water-holding capacity; expansion and contraction of soil; capillarity; flocculation; percolation of water; absorption of moisture; effect of water on separating different sizes of soil particles; mechanical analysis of soil; physical properties of soils and their separates; effectiveness of mulches on evaporation of water from soils; soil tenacity; examination of total moisture in field samples; examination of capillary moisture; examination of soil profiles in the field.
 - 3. Practical use of tillage implements and hand tools.
- 4. Practical work in carpentry and smithy as required for the ordinary repairs of agricultural implements.

No University examination will be held in carpentry and smithy; but each candidate should have carried out exercises to give him sufficient practice to do ordinary repairs and fit up agricultural implements. The Principal must certify that the candidate has taken the necessary practice, and has attended at least twenty periods during the year. The Principal's certificate must be attached to the first year University form.

5. An elementary practical acquaintance with the methods of cultivation of common crops; a knowledge of parts used, periods and habits of growth; recognition of crops in all stages including seeds.

R. 124B.

II.—CHEMISTRY.

(Two papers and a Practical Examination)

Paper I of two hours—Physical and Inorganic Chemistry.

Physical Chemistry.

Law of Mass Action.

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Elementary Thermo-Chemistry; Law of Hess: big and small calories. Ionic hypothesis; degree of dissociation; strength of acids and bases; hydrogen ion concentration; meaning of pH; its determination; buffer action.

Colloids and their elementary properties; kinds of colloids; osmosis and osmotic pressure.

Inorganic Chemistry.

Natural waters, temporary & permanent hardness; potable and irrigation waters.

Halogen elements, phosphorous, arsenic, silicon, sulphur and carbon: their important compounds; nitrogen in nature, fixation of atmospheric nitrogen.

Ammonium, potassium, barium, calcium, copper, zinc, manganese and boron; their important compounds.

Paper II of three hours-Organic Chemistry.

Carbon compounds and their classification.

Carbon compounds: general composition, physical properties, general classification. Compound radicals, closed and open carbon chains, saturated and unsaturated compounds.

Isomerism, metamerism, polymerism.

Hydrocarbons: methane, ethane, ethylene and acetylene.

Halides: ethyl chloride, ethyl bromide, ethyl iodide, chloroform, iodoform.

Alcohols: methyl, ethyl; glycerine, sterols, ethyl ether.

Aldehydes and ketones: formaldehyde, acetaldehyde and acetone.

Acids: formic acetic, propionic butyric, palmitic, stearic, oleic, oxalic, lactic, tartaric, citric and malic.

Fats and oils, soaps, butter fat and butter substitutes.

Esters of organic and inorganic acids.

Carbohydrates: pentoses, cane sugar, bextrose, fructose, lactose, maltose, starch, dextrin; hemicelluloses; cellulose, lignin.

Acetamide, urea, amines, amino acids, proteins.

Cyanogen compounds: cyanogen, hydrocyanic acid, and potassium cyanide; glucosides.

Aromatic compounds: benzene, tolaene, nitrobenzene, aniline, phenol, benzyl alcohol, benzaldehyde, benzoic acid, salicylic acid, hippuric acid, uric acid, gallic acid, tannins.

Elementary knowledge of the chemical nature of terpenes and camphors; indigo and indole; alizarin and naphthalene; alkaloids.

[Part II

Practical Work.

Preparation and use of standard solutions as are required in the simple acidimetry and alkalimetry and also in volumetric determination of iron and chlorides.

Qualitative analysis of inorganic salts containing not more than two bases and two acids.

Qualitative examination for the presence of alcohol (ethyl alcohol), sugars, starches, tannin, albuminoids, fats and also for acetate, oxalates, tartrates, and cyanides from organic substances.

Quantitative estimations of copper, iron, aluminium, calcium, magnesium, chloride, sulphate, and phosphate, from inorganic salts.

R. 124C.

III-BOTANY.

(One Paper and a Practical Examination.)

Elementary morphology.

Structure and germination of seed, seed testing. Root: root systems, modifications of roots. Stem: parts, modifications of stems, modes of branching. Bud: development and structure. Leaf: structure, types and modifications. Flower: parts, symmetry and modification of parts. Inflorescene: types. Fruit: structure, dehiscence, and dispersal of seed.

Elementary histology.

The typical plant cell. Internal structure of root, stem and leaf. Tissues, their function and arrangement. Structure, and development of anther and ovule. Pollination, fertilisation, development of the embryo.

Elementary physiology and ecology.

Main facts in relation to nutrition, growth and response to environment. Fundamental facts of ecology as illustrated particularly by the local flora.

Taxonomy.

Study of the general characteristics of representative types from each of the different groups of the plant kingdom, viz., bacteria, fungi, algae, mosses, ferns, gymnosperms and angiosperms.

Principles of classification of the Angiosperms. The study of the general characteristics of the following economically important natural orders: Cruciferae, Leguminosae, Solanaceae, Compositae, Rutaceae, Cucurbitaceae, Malvaceae, Myrtaceae, Gramineae.

Practical Work

The theoretical course will be illustrated by suitable practical work, a record of which must be kept by each student. The handling of microscopes and the cutting of hand sections of the different parts of plants will also be included in the practical work.

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R. 124D.

IV .- GENERAL ZOOLOGY.

(One Paper and a Practical Examination.)

1. Elementary Zoology.

The distinctive properties of the living and the non-living bodies. Distinction between animals and plants. A general survey of the animal kingdom. A short classification and general characters of the Vertebrata and the Invertebrata. General account of the animal cell and types of tissue. Elementary study of physiology and reproduction.

Study of the skeleton, muscular, and digestive systems of the rabbit and fowl.

2. Anatomy and Physiology of live stock.

Kinds of agricultural live stock. Animal form. External anatomy of the ox, buffalo, sheep and goat.

Internal anatomy and physiology of the ox.

Practical Work

Examination and dissection of the rabbit and fowl.

Attendance at demonstrations of external and internal anatomy of animals and practice in the recognition of organs and tissues.

R. 124E.

V.—MATHEMATICS AND PHYSICS.

(Two Papers and a Practical Examination.)

First Paper

1. Elementary mensuration of surfaces and solids.

Area of plane surfaces as applied to the measurement of land. Volumes of solid, regular and irregular, applied to the measurement of stacks, sheds, heaps, and the like. Capacity of tanks and wells.

2. Graphic methods.

Use of squared paper, scale of representation. Plotting of points; linear graphs; independent and dependent variables; graph of function; representation of algebraic functions; graphic solution of liner equations; reading off of values from graphs; interpolation.

3. Biometry.

Representativeness and adequacy of sampling; precision and errors of measurement: recording and handling of data; calculation of constants in common use; making and study of frequency and correlation table and curves; goodness of fit; significance of results.

Second Paper

1. Elementary applied mechanics.

Force; movements of forces, practical application, simple forces, resultant and component of forces, centre of gravity. Relation between force, mass and motion.

Work: in lifting, rotation and machines. Mechanical advantage. Modulus of a machine. Principle of work verified in the case of simple machines.

Power: horse power, engines, pumps, brakes.

Energy: mechanical thermal, and their relations.

Friction: nature of friction, laws, co-efficient of friction, angle of repose, work done in overcoming frictional resistance. Tractive force, Lubrication.

Tractive force on a gradient.

Simple machines: effort, friction and efficiency.

Strength of materials: strain, and stress, elasticity, shafts, beams.

Hydraulic machines: equal transmission of fluid pressure, hydraulic press, jack, accumulator, pressure, head buoyancy, density. The suction, single and double acting force pumps. Capillarity.

2. Meteorology.

Air, its composition.

Climate, factors which determine climate. The variations of atmospheric pressure, Solar and terrestrial radiation.

Temperature variation, seasonal and diurnal. Soil temperatures. Exposure of thermometers.

The moisture in the atmosphere, its measurement by hygrometer. The formation of dew and frost, clouds and their classification, rain and its measurement, snow.

Winds, regular and periodic and the influences that determine them. Cyclones and anticyclones, wind forces. Variations of rainfall in India, their causes.

Climatic zones.

The scientific basis of weather forecasting. The daily weather report. Meteorological instruments and their use.

Practical Work.

Each candidate should work out practically twenty experiments on the course of applied mechanics and meteorology relating to force, friction, hydraulic pressure, density and the use of meteorological Chap. XXXIV] SECOND YEAR SC. (AGRI.): ADMISSION

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instruments. He should also do practical work on the calculation of statistical constants and on the preparation of tables and graphs.

Standard for Passing the Examination.

- R. 125. All candidates for the First Year Examination in Science (Agri.) must obtain, in order to pass, forty per cent. of the total number of marks obtainable in the papers in each subject and in each practical examination.
- A candidate who has obtained fifty per cent. of the total marks in any subject (including the practical) at any one examination may, at his option, be excused from appearing in that subject (provided he has obtained the minima in the papers and in the practical of that subject as required by Regulation 125) at a subsequent examination and will be declared to have passed the whole examination when he has passed in all the subjects of the examination: provided that in the subject or subjects, in which he appears on the last occasion, he must obtain the minimum in each paper or subject or practical. Candidates passing the examination in this manner in compartments will not be eligible for a class or any prize or scholarship to be awarded at the examination.

(18)—SECOND YEAR EXAMINATION IN SCIENCE (AGRI.).

Admission.

- 0. 231A. No candidate will be admitted to this examination unless he has kept two terms in a school or college recognised in Agriculture by the University of Bombay, subsequent to passing the First Year Examination in Science (Agri.).
- A student who has passed in all subjects but one at the First Year Examination in Science (Agri.) in conformity with Regulation 126 of that examination, will be allowed to keep terms and appear for the Second Year Examination after keeping two terms but will not be declared to have passed the Second Year Examination under any circumstances unless he has passed in the remaining subject of the First Year Examination held either in a previous, or in the same examination season.
- R. 127. Candidates will be examined in the following subjects:
 - (1) Agriculture.
 - (2) Agricultural Chemistry.
 - (3) Agricultural Botany and Bacteriology.
 - (4) Agricultural Engineering.

The following table indicates the sub-heads of each subject, their distribution by terms, the number of credits allowed to each sub-head, the number of papers and the time allowed for each paper and the allotment of marks in the University Examinations.

	Subjects and sub-heads.		For T	eachin	g.	For Examination.					
			credits		Second term credits Pap. Prac.		Time fo each Paper.	r Mark eac Paper.	h	Total.	
(1)	Agriculture Soil Management Climatology Crop-Production	3 1 2	<u>-</u>	<u>-</u> 2		2	2	75	150	300	
(2)	Agricultural Chemistry Soil Chemistry & Bacteriology. Soil Fertility Physiological Chemistry	2 - 2	1 - 1	2 1	1 1 1	2	2	75	100	250	
(3)	Agricultural Botany and Bacteriology Cytology and Histology Plant Physio- logy Bacteriology Genetics and Crop Breeding.	2 1 1 -	1 1 1	_ 1 1 3		2	3	100	150	350	
(4)	Agricultural Engineering Total	$\frac{3}{17}$	$\frac{2}{10}$	$\frac{4}{15}$	$\frac{1}{11}$	1	3	100	100	200	

Note:—One credit means one lecture period or one period (about two hours more or less) of practical work per week per term.

R. 128.

The practical work done by each student during the year must be recorded in note books, which must be attested by the Principal of the College and presented to the examiners. In all cases candidates shall be examined orally or practically on the work recorded in their note-books.

R. 129.

On the recommendation of the Board of Studies, the Academic Council may, from time to time prescribe or recommend text-books in the various subjects of this examination and modify from time to time, as may be found necessary, the details of the theoretical and practical courses laid down for this examination.

Syllabus.

R. 130A.

I.—AGRICULTURE.

(Two Papers and a Practical Examination)

First Paper

1. Soil Management.

Differences in the kind and degree of tillage for different types of soils, climates and crops.

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A proper seed bed. Seeds and setts. Methods of sowing and planting; transplanting; spacing. Depth of sowing and planting.

Principles underlying manuring of crops. Soil fertility and how to maintain it. Kinds, quantities, methods and times of application of manures.

Kinds of weeds, their habit of growth, their effect on crops and soils, and methods of eradication.

Water requirements of crops, sources of water, conservation of water in the soil, removal of excess water from soils. Irrigation, its necessity, soil suitable for irrigation, laying out of land, application of water to land, cost of irrigation, management of irrigated lands. Water lifts.

2. Climatology.

Meaning. Relation of climate to agriculture in general. Factors which determine climate. How to estimate the climate of a locality. Climatic divisions of the world in general and of India and the Bombay Presidency in detail. Possibilities of modifications in climatic factors.

Relation of climate to nature of crops and kind of farming, with special application of the principles to each Indian Province and to each part of the Bombay Presidency.

Famines, their relationship to climate in general and in India; preventive and remedial measures.

Second Paper

Crop production.

Detailed study of the following classes of crops grown in the Bombay Presidency with special reference to suitability, to seasons and soils, distribution, choice of varieties, methods of growing and harvesting, protection against animals and birds, outturns, costs, values, uses and improvements:—

(i) Cereals, (ii) pulses, (iii) oil-seeds, (iv) sugar crops, (v) vegetables, (vi) fibre crops, (vii) condiments and spices.

Practical Work

Each candidate must have cultivated in a satisfactory manner during one year, with his own hands a plot at least one-tenth of an acre in size with two crops and must present a regular diary of work and weekly observations on the crops so cultivated, with necessary remarks and marks on the students' work by the teacher at least once in each term.

One-half of the total number of marks shall be set apart for the practical work done during the year and presented as plot records and diaries maintained by the candidate.

Recognition of manures and important weeds, preparing seeds and setts for sowing. Ability to do all the farm operations in the cultivation of crops, working of the different contrivances for raising water, laying out fields for irrigation.

R. 130B.

II.—AGRICULTURAL CHEMISTRY. (Two Papers and a Practical Examination.)

First Paper.

1. Soil Chemistry.

Chemical composition of soil-forming rocks and minerals, their decomposition.

Mineral constituents of the soil. Insoluble constituents: sand, clay, chalk; their composition, properties and changes they undergo. Soluble constituents: their movements, relation to plant growth, injurious salts. Alkali lands, their development and improvement.

Organic matter in the soil: sources, importance, properties, function, chemical changes produced in it. Humus. Acid soils.

Irrigation water: composition and effect on soils and on plant growth.

Air in the soil, its composition and variation in composition due to various causes.

Analysis of soils, potential and available. Interpretation of results. Soils of the Bombay Presidency and their nature as revealed by chemical composition.

2. Soil Bacteriology.

Origin and development of soil bacteriology.

Bacteria in relation to organic matter in the soil. Decay, fermentation, putrefaction, Green manuring.

Bacteria and their relation to nitrification, denitrification and nitrogen fixation.

Influence of environment on soil micro-organisms; nature of soil, heat, antiseptics and poisons, irrigation water, sewage, manures. Algae, fungi and protozoa in the soil.

3. Soil fertility.

Fertility of soils, factors on which it depends.

Causes of barrenness in soils; toxic substances and theories regarding their formation.

Amelioration of soils: drainage, liming, burning, and their effects. Manures and manuring:

- (i) Bulky manures: farmyard manure, night soil, poudrette, various dungs, farm and other refuse, green manuring, leaves, etc. Fermentation of farmyard manure; synthetic or artificial farmyard manure; preservation of farmyard manure; chemical changes produced in storage and in soil.
- (ii) Sewage and activated sludge, changes produced during the process, uses and effects on soils and crops.

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- Oil cakes, bones, fish : their decomposition and effects on (iii) typical soils in India.
- Artificial manures: nitrogenous, potassic, phosphatic, (iv) etc.; their sources and effects on soils and crops in India.

Analysis and valuation of manures. Effects of manures on the composition of crops particularly in the Bombay Presidency.

Second Paper

Chemistry of plant products.

Plant products from agricultural and horticultural plants; cellulose, fibres, sugars, starches, gums, resins, essential oils and their purification and hydrogenation, indigo and other colouring substances, rubber, proteids alkaloids.

Changes produced during fermentation of tea leaves, sweating of cocoa seed, roasting of coffee seed, and ripening of fruits.

Composition of important seeds and fruits.

Chemistry of animal nutrition.

The food requirements of animals; the processes of digestions, assimilation and excretion.

Constituents of foods, their importance.

Composition of food stuffs, their digestibility, net energy, value of nutrients, starch value, albuminoid ratio, money value of foods, vitamins, poisonous substances.

Feeding standards, their use.

Analysis and examination of feeding stuffs and interpretation of results.

Relation of food to manure.

Dairy chemistry.

Milk, its composition. Preparation and properties of casein and lactose. Preservation of milk, pasteurisation, sterilisation, boiling, condensed milk, effect of these on milk. Preservatives. Separated milk, milk powder, cream, and their composition. Adulteration of milk, analysis of milk and interpretation of results.

Butter, ghee and other milk products: composition, adulteration, methods of analysis and interpretation of results.

Practical Work

Analysis of:

- Irrigation water. (i)
- Soil extracts. (ii)
- Soils to determine moisture, loss on ignition, lime, iron, (iii) alumina, phosphoric acid and nitrogen.

Determination of nitrogen from bulky manures and sewage. Analysis of Superphosphate and bone meal, oil cakes, Sulphate of

Ammonia, Nitrate of Soda (by refraction method). Quantitative and qualitative analysis of mixtures of manures.

Students are expected to interpret the results of analysis.

Examination and identification of sugars, starches, cellulose, gums, proteids, fats.

Examination of feeding stuffs as to their suitability for feeding cattle. Determination of proteids, carbohydrates, ether extract, fibre, mineral matter, sand from feeding stuff.

Determination of glucose and sucrose from sugar-containing materials.

Examination for specific gravity of milk, total solids, fat, casein and lactose from milk. Determination of fat, casein, salt and moisture-from butter. Use of butyro-refractometer in the examination of butter and the expression of opinion on purity.

R. 130C.

III.—AGRICULTURAL BOTANY AND BACTERIOLOGY. (Two Papers and two Practical Examinations.)

First Paper

1. General Bacteriology.

Introduction to the study of bacteriology. The position of bacteria in the plant kingdom. Morphology and classification.

Cultural methods. Methods for studying physiological characters.

Physiology of bacteria: effect of physical and chemical changes, on bacteria; chemical changes produced by bacteria; enzymes and fermentation.

Relation of micro-organisms to the preservation of food, Fermentation of carbohydrates. Lactic, acetic, butric and citric fermentation. Fermentation of polysaccharides and fats. Decomposition of organic nitrogenous compounds. Bacteria of the soil.

Disease, infection and resistance.

Bacteria which causes plant disease.

Infectious diseases of unknown etiology, i. e., of virus type.

Bacteriology of water and sewage.

Bacteriology of milk.

2. Plant Physiology.

Study of important vital processes in plants.

Protoplasm: function, constituents, physical and chemical properties.

Absorption of water and solutes. Osmosis. Ascent of sap.

Photosynthesis. Formation of carbohydrates. Enzyme action. Plant products—proximate and ultimate. Translocation. Nitrogen assimilation. Synthesis of proteins. Respiration and fermentation. Carbon and nitrogen cycle.

Chap. XXXIV] SECOND YEAR SC. (AGRI.): SYLLABUS IN BOTANY

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Growth movement: autonomic, paratonic. Response to external stimuli. Tropic and tactic movements. Physiology of reproduction.

Second Paper.

1. Cytology and Histology.

Study of cell, its contents and structure. Nucleus and its structure, nuclear division. Chromosome: structure, individuality and behaviour in division. Cell wall: nature and modification.

Study of different tissues in plants, their development and adaptation to their function.

2. General Genetics and Crop Breeding.

The aim and contents of genetics. Variation, kinds and causes. Theories of inheritance; the mechanism of inheritance; the role of the chromosome; the nature, distribution and function of genes.

The work of Mendel; Mendelian ratios; later development of Mendelism.

Polyploidy and chromosome aberrations; mutation; sex determination; multiple, modifying and lethal factors.

Biometry: importance, scope and limitation of the application of satisfies to genetics.

The contribution of genetics to the theory of evolution.

Short history of crop breeding; the aim of crop breeding; the relation between pure genetics and crop breeding.

The raw material of crop breeding and how it is purified; isolation of pure lines; study, recording and evaluation of pure lines; need to keep pure lines as sources of useful genes.

Aims and methods of hybridisation of plants; the study of F₁, F, and subsequent generations; selection in hybrid races; composite hybrids, backcrosses; breeding for disease resistance.

Organisation of seed-supply of improved races of plants.

Breeding of the following crops: wheat, jowar, bajri, maize, rice, cotton, sugarcane, tobacco, tomato, potato, chilli, castor, safflower groundnut, pulses, fruit trees.

Pratical Work

On First Paper.

Bacteriology.

The practical course in bacteriology will consist of practical work in the laboratory. Media, their composition and methods of preparation. Morphology: vegetative cells, capsules spores motility, staining reactions. Cultural characters; agar stroke, gelatin stab, potato, nutrient broth's sediment, agar colonies. Physiological characters: temperature relations, relation to reaction of medium, chromogenesis, indol production, H₂ S production, relation to oxygen, milk, nitrate reduction, hydrolysis of starch, fermentation of sugars. Estimation of bacteria by dilution and plating. Examination of soil bacteria. Examination of milk.

Plant Physiology.

Students are expected to carry out experiments to illustrate osmosi (study of osmotic pressure of cell sap by plasmolysis method); absorption; root pressure; transpiration; turgescence; guttation; suction pressure; respiration, ærobic and anærobic; photosynthesis; growth; response to external stimuli, light, heat, Co₂, etc., action of enzymes; fermentation.

On Second Paper.

Cytology and Histology.

Preservation, killing and fixing of plant material for histological and cytological examinations. Embedding, staining and mounting.

Use of microtome, methods of cutting sections for histological and cytological studies.

Measurement of microscopic objects. Use of camera lucida. Magnifications and how to obtain them.

Genetics and Crop Breeding.

The preparation of frequency tables and curves, and of correlation tables and curves from original data obtained by the student; the working out of constants from these data; and the determination of the significance of results obtained.

The study of Mendelian ratios in plant and animal populations.

The working out of type problems in genetics.

The student shall study in the field the process of selection and hybridisation, and shall be able to perform the operations of preparing flowers of different crops for hybridisation; he shall keep records of a hybrid progeny.

R. 130D.

IV .- AGRICULTURAL ENGINEERING.

(One Paper and a Practical Examination)

1. Elementary surveying and levelling.

Sufficient for small agricultural works such as farm roads, channels, pumps and pipe lines. Levelling and bunding drainage and survey of farms.

Survey.—Construction of scales. Representative friction. Surveying with the chain, triangulation and tie lines. The use of cross staff, optical square, prismatic compass, plane table, field book. Method of plotting surveys. Reading maps and plans.

Levelling.—Dumpy and Farmer's levels, and their adjustments. Levelling staff, Levelling field books. Bench Marks. Plotting the work. Contours, sections and cross-sections.

2. Elementary hydraulics.

Sufficient for small channels and discharges. Fluid friction. Flow of water through orifices and sluices. Flow of water through pipes and channels. Section, velocity and discharge.

Chap. XXXIV] SECOND YEAR SC. (AGRI.): SYLLABUS IN ENGIN. 331

Measurement of water through channels and weirs. Rectangular and V notches and Cippolletti weirs. General principles of water wheel, hydraulic ram, Archimedian screw.

3. Irrigation.

Sources: tanks, catchment area; run-off and capacity. Small pick-up-weirs on Nalas. Selection of site. Construction of wall and bank. Waste weir. Duty of water. Irrigation programme and rotation statements.

Small irrigation channels. Alignment. Section, gradient and construction. Wells and well sinking, boring, cone of depression.

Lift irrigation. Picottah, mhot, Persian wheel, Archimedian screw, centrifugal pump, chain pump—their capacity, cost of working, efficiency and adaptability.

4. Land drainage.

Methods of drainage. Surveying, design, location, construction and cost. Salt lands, their improvement by drainage.

5. Land development.

Simple farm structures, their rough cost. General knowledge of farm roads and fencing. Embankments. Conditions suitable for land development. Erosion. Levelling, embanking, terracing, silt catching, percolation, raising sub-soil water level—their design, construction and cost.

6. Implements (only those applicable to Indian conditions).

Automatic seed drills, simple winnowing and mowing machines, shaff-cutters, sugar-cane crushers. Simple separators and churns. Sprayers and dusting machines.

Oil engines: general principles and types. Valves, ignition simply treated, vaporisation, carburation silencing exhaust, cooling. Care and running of oil engines. Efficiency and power of the engine. Cost.

General ideas of the principles and working of tractors.

7. Transmission of power.

Different methods of transmitting power and their application. Pulleys and belting. Size and care. Belt joints. Toothed gearing. Calculations for size. Velocity ratio. Shafting and bearing. Lubrication.

Practical Work.

Each candidate must have conducted, with others, the survey of land and carried out surveys illustrating the simple problems on the farm. The plotted drawings with the survey books, drawings o very simple farm buildings, drawings of important parts of implement showing working arrangement, and the arrangement of transmission

of power must be submitted to the examiners, who will take them into consideration in allotting marks for the practical examination.

The practical examination will consist of testing the familiarity of the student with the surveying and levelling instruments, transmission of power, gearing, velocity ratio, mechanical advantage and the works connected with the different problems of the subject; Lining out, putting up profiles for bunds and channels, fixing fence.

Standard for Passing the Examination.

- R. 131. All candidates in the Second Year Examination in Science (Agri.) must obtain, in order to pass, forty per cent. of the total number of marks obtainable in the papers in each subject, and in each practical examination.
- R. 132. A candidate who has obtained fifty per cent. of the total marks obtainable in any of the subjects may, at his option, be exempted from appearing in that subject (provided he has obtained the minima in the paper and in the practicals of that subject as required by Regulation 131) at a subsequent examination and will be declared to have passed the whole examination when he has passed in all the subjects of the examination, provided that in the subject or subjects in which he appears on the last occasion he must obtain the minimum in each paper, or subject or practical. Candidates passing the examination in this manner in compartments will not be eligible for a class or for any prize or scholarship to be awarded at the examination.

(19)—EXAMINATION FOR THE DEGREE OF BACHELOR OF SCIENCE. (AGRI.)

Admission.

- 0. 231B. No candidate will be admitted to this examination unless he has kept two terms in a school or college recognised in Agriculture by the University of Bombay, subsequent to passing the Second Year Examination in Science (Agri.)
- Year Examination in Science (Agri.) in conformity with Regulation 132 of that examination will be allowed to keep terms and appear for the B. Sc., (Agri.) Examination after keeping two terms, but will not be declared to have passed the B. Sc. (Agri.) Examination under any circumstances unless he has passed in the remaining subject of the Second Year Examination held either in a previous, or in the same examination season.
- R. 133. Candidates will be examined in the following subjects:—

 I. Agriculture.
 - II. Horticulture.
 III. Plant Pathology.
 - IV. Entomology.V. Agricultural Economics.

The following table indicates the sub-heads of each subject, their distribution by terms, the number of credits allowed to each sub-head, the number of papers and time allowed for each paper and the allotment of marks in the University Examinations.

Subjects	For	Teac	hing.		For Examinations.					
and sub-heads.	First ter Credit Pap. Pre	S	Cred	its	No. of Papers.	Time for each Paper.	Paran	s for ch . Prac.	Total.	
(1) Agriculture									425	
Crop produc- tion and Field E x periment technique		2	2	2	. 1	$2 \cdot$	75	50		
Animal feeding and management	-	1	1	² }						
Breeds and animal breed ing		1	0	1						
Animal Hy giene and surgery &c.		1	0	1	2	2	75	150		
Dairying and Dair Farming	g y 1	1	1	1						
(2) Horticulture	. 2	2	2	2	1	2	75	50	125	
(3) Plant Pathology	2	2	2	2	1	2	75	50	125	
(4) Entomology.	2	2	2	2	1	2	75	50	125	
(5) Agri. Economics	4	0	4	0	1	3	100		100	
Total.	15	12	14	13					900	

R. 134.

The practical work done by each student during the year must be recorded in note-books, which must be attested by the Principal of the College and presented to the examiners. In all cases candidates shall be examined orally or practically on the work recorded in their note-books.

On the recommendation of the Board of Studies, the Academic R. 135. Council may, from time to time, prescribe or recommend text-books in the various subjects of this examination and modify from time to time, as may be found necessary, the details of the theoretical and practical courses laid down for this examination.

Syllabus.

R. 136A.

I.—AGRICULTURE.

(Three Papers and two Practical Examinations.)

First Paper

1. Crop productions.

Detailed study of the following classes of crops grown in the Bombay Presidency with special reference to suitability to seasons and soils, distribution, choice of varieties, methods of growing and harvesting, protection against animals and birds, outturns, costs, values, uses and improvements :-

- (i) Forage crops, (ii) Dyes,
- (iii) Drugs and narcotics.

2. Farm accounts.

Farm records and farm accounts.

Field Experiment Technique.

The aims and objects of field experiment; a short history of the development of field experiment technique.

The selection of a site for field experiments; study of soil variation; kinds of soil variation, random and regular; methods of overcoming soil variation.

The lay-out of field experiments; number of varieties or treatments to be tested; size of plots; number of replications; number of years in which the experiment is to be repeated.

The recording of data on field experiments; the need for and nature of notes to be made throughout the experiments; the precautions to be taken in obtaining the final data; the calculations to be made from the final data; the testing of the significance of these results.

Second Paper

1. Breeds and animal breeding.

Kinds of live stock and their importance. Study of live stock with special reference to milk, draft, meat, eggs and wool. Description, distribution, and purposes of the Indian breeds of live stock. Types of foreign breeds, namely, cattle: Holstein, Ayreshire, Jersey; Merino sheep; poultry: White Leghorne, Rhode Island Red, Australorp. Judging by outward appearance and by score card; their Valuation of live stock. use and limitation.

Importance of animal breeding, short history of the past and present work, future scope. Application of the principles of genetics Chap. XXXIV] B. SC. (AGRI.): SYLLABUS IN AGRICULTURE

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to improvement of farm animals. Heredity and variation. Breeding of animals for different purposes, maintenance of records, interpretation of results. Breeding stock with reference to fecundity; breeding organs and reproduction.

History of the short-horn breed of cattle and Leicester sheep in Great Britain.

Review of breeding work in India in general and the Bombay Presidency in particular. Recent progress in breeding in foreign countries and its value in solving local problems.

2. Animal feeding and management.

Foods. Roughages and concentrates, and nutrients these supply for different purposes and for different stocks including poultry.

Basis for calculations (feeding standards for various purposes, weight of animals, composition of food stuffs, limitations and other requirements besides nutrients).

Different methods of making rations in India in general and the Bombay Presidency in particular, their merits and defects. Times of feeding.

Sources of roughages and concentrates available in India in general and the Bombay Presidency in particular, their comparative feeding value. Selection and storage of feeding stuffs. Grass lands and their management; important grasses in the Bombay Presidency and their feeding value.

Factors affecting the utility of feed; silage and silage making, hay making, chaffing, cooking, grinding.

Care of stock; watering, grooming, shaving, clipping, numbering, dehorning, fitting for shows, exercise.

Management of pregnant animals, newly born calves, young stock, working stock, breeding stock, poultry including hatching and storing of eggs, and marketing of eggs and birds.

Housing and sanitation of live stock.

Third Paper

1. Dairying and dairy farming.

Composition of milk. Factors influencing quality and quantity of milk. Food value. The hygiene and handling of milk. Milk products: cream, curd, butter, ghee, etc.

The essentials of dairy farming, subsidiary and commercial.

2. Hygiene, surgery, obstetrics and pathology of farm livestock.

Hygiene: general considerations on vaccination and prevention of diseases.

Surgery: general principles and practices of castration: treatment of wounds; principles and practices of shoeing of animals.

Simple obstetrics including the more common forms of abnormal parturition, treatment of the diseases of parturition.

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[Part II

Pathology: Signs of health and disease. The nature of disease. Abscesses, tumours, sores, and their treatment. Treatment of lameness. Infection and immunity. Common parasites, parasitic diseases. Diagnosis and treatment of common diseases in cattle. Diagnosis and the principles of treatment of the more deadly forms of infectious diseases. A knowledge of the drugs easily available in local bazars and such other drugs as are used in daily veterinary practice. The drugs should be limited to those in use in treating common diseases of cattle. Poisons and poisonous plants, symptom of common poisoning and their treatment.

Practical Work.

Each candidate must have managed in a satisfactory manner during one year a plot of at least one acre in extent and must present duly filled, advance programmes of work, and records of daily labour and cost, accounting of crops and of periodical observations, balance sheets and other accounts necessary in farm business.

Each candidate must have, during the third year, taken an agricultural tour in the Bombay Presidency, and the notes taken in connection therewith must be presented to the examiners.

The students shall observe throughout their duration, make notes on and work out results and their significance from experiments laid out according to various standard methods.

Each student must have fed and looked after two milch animals during the year.

First Practical Examination.

Ability to recognise good seed and good plants for seed production. Selection of implements for different conditions and purposes. Judging and valuing of crops.

Second Practical Examination.

Determination of breeds of live stocks. Detection of merits and defects. Judging cattle. Milking.

Recognition of feeding stuffs, examination for purity and genuineness. Making of rations for different stocks and purposes.

Ability to make dairy products including the setting up and working of cream separators, churns for butter making, packing and storing butter, and cleaning, care and maintenance of dairy appliances. Testing of milk, cream, butter milk and separated milk.

Treatment of sick animals including the use of clinical thermometer, taking pulse, bandaging, dressing wounds, dieting, application of ointment and liniments. Diagnoses and treatment of common diseases. Prevention and control of infectious diseases.

Materia Medica. Principal drugs and their use.

R. 136B.

II.—HORTICULTURE.

(One Paper and a Practical Examination.)

Fruit growing: propagation of plants, soil and water requirements, selection of sites, spacing, pruning, root exposure, intercropping, watering and manuring.

Chap. XXXIV] B. SC. (AGRI.): SYLLABUS IN ENTOMOLOGY

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Cultivation of the important fruit crops of the Bombay Presidency namely, mango, banana, citrus, pomegranate, grape, guava and fig.

Fruit preservation. Canning and drying of fruits.

Practical Work.

Practice in various horticultural operations including propagation, grafting, budding, pruning transplanting, canning and drying of fruits.

R. 136C.

III-PLANT PATHOLOGY.

(One Paper and a Practical Examination.)

The nature of fungi, their position in the plant kingdom. The structure of fungi. The different methods of reproduction. The food of fungi and how they feed. Saprophytes, parasites and their modification. Symbionts, polymorphism, heteroecism and physiologic specialisation. Dissemination of fungi. Mode of infection.

Economic importance of plant diseases.

Definition of disease. Symptoms. Classification of plant diseases.

Relation of environmental factors to disease.

Control measures including cultural practices, soil sterilisation, seed treatment and protective measures. Fungicides: preparation, application and mode of action. Appliances such as ordinary dusters and sprayers.

A general classification of fungi, characters of main groups.

Discussion of important plant diseases caused by fungi and bacteria and those due to virus and physiological causes; their symptoms and control.

Practical Work.

The course will consist of practical work in the laboratories and in the field. Study of important plant diseases and practice in isolation of parasites, cultural methods, spore germination and infection. Recognition of plant diseases in the field. Composition and preparation of fungicides. The practical application of remedial measures against plant diseases including a knowledge of ordinary dusters and sprayers.

R. 136D.

IV .- ENTOMOLOGY.

(One Paper and a Practical Examination.)

Systematic position of insects in the animal kingdom. The development of insects and metamorphosis and adaptive colouration among insects. The structure of a caterpillar and chief types of winged insects. The anatomy and physiology of insects treated in a broad sense. Insects in relation to plants and animals and various tropisms.

Classification (into orders) of insects. Characters and habits of the typical insects, especially of those families which are of agricultural importance:

[Part II

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Detailed life histories' habits and food plants of major insect pests of the field and garden crops of the Bombay Presidency. Various methods of control, agricultural, mechanical, insecticidal, etc. Natural checks. Insects of stored products and their control.

Animal parasites of crops: mites, eelworms, their control. Sericulture, lac cultivation and bee keeping treated in an elementary way.

Practical Work.

Each candidate must submit a collection of harmful insects and a note-book containing an account of the practical work done during the year. Candidates may be examined orally or practically in the work recorded in their note books.

Each candidate must be able-

(i) to distinguish and describe the structure and visceral organs of insects with sketches;

(ii) to arrange and classify into orders the set and labelled

specimens of collected insects;

(iii) to recognise pests in their different stages as well as from the nature of damage to crops;

(iv) to prepare insecticides;

(v) to handle appliances such as dusters, sprayers, fumigating machines.

R. 136E.

V.—AGRICULTURAL ECONOMICS.

(One Paper only.)

1. Elements of Economics.

Scope and importance of economics.

Consumption. Utilities and goods. Law of diminishing utility. Laws of Demand.

Production. Factors of production: Land, Labour, Capital and Entrepreneur. Organisation of the factors of production.

Exchange. Theory of value, its importance and different meanings. Market Value and Price. Laws of supply and demand. Money, Credit and Banking. International Trade.

Distribution. Rent, Wages, Interest and Profits.

Taxation. Direct and Indirect Taxation, their general principles.

2. Agricultural Economics.

Nature, scope and importance of agricultural economics. Economic and social motives. Development of farmer's economic problems.

Land as a basis of agricultural production. Influence of rainfall and climate. Efficiency and capacity. Possibilities of increasing land. Law of diminishing returns.

Farm labour. Supply, reasons for scarcity. Wages, factors determining wages, different systems of employing and paying labour. Adjusting farm enterprises to labour efficiency and supply.

Chap. XXXIV]

M. AG.: ADMISSION

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Different forms of agricultural capital. Agricultural credit, kinds, sources and uses Co-operation, principles, organisation and management of co-operative credit societies. Primary societies, unions, District and Provincial banks.

Farm management. Selection of farms, geographic factors and agricultural regions. Size of farms. Type of farming and choice of crops and live stock. Competitive and supplementary crops. Specialised and diversified farming. Equipment of farms: buildings, animals, power and implements.

Proportions of the factors of production, Law of variable returns, combination of the grades of factors of production.

Cropping schemes and financial forecasts. Incomes and profits. Factors affecting income.

A brief survey of land tenures in India with special reference to land settlement in the Bombay Presidency. Land classification, land assessment, rights and liabilities of occupants.

Rent, theory of land rent, factors determining rent and profits. Relation of rent to value. Relation between landlord and tenant.

Marketing problems and difficulties in marketing farm produce. Types of marketing, marketing services, marketing methods, marketing agencies. Basis of transaction, Middleman and his services. Cooperative Sale Societies, their organisation and management. Supply and Demand. Prices. Market weaknesses, remedies and State help. Marketing of important crops such as cotton, gul and jowar.

Standard for Passing the Examination.

- R. 137. All candidates in the examination for the Degree of Bachelor of Science (Agri.) must obtain, in order to pass, forty per cent. of the total number of marks obtainable in the papers in each subject, and each practical examination. Candidates who obtain fifty per cent. of the total on the aggregate of the three years will be considered to have passed with honours.
- R. 138. A candidate who has obtained fifty per cent. of the total marks obtainable in any of the subjects may, at his option, be exempted from appearing in that subject (provided he has obtained the minima in the papers and in the practicals of that subject as required by Regulation 137) at a subsequent examination and will be declared to have passed the whole examination when he has passed in all the subjects of the examination: provided that in the subject or subjects in which he appears on the last occasion he must obtain the minimum in each paper, or subject or practical. Candidates passing the examination in this manner in compartments will not be eligible for a class or for any prize or scholarship to be awarded at the examination.

(20)—MASTER IN AGRICULTURE. (For 1939 only)

0. 233. Every candidate for the Degree of Master in Agriculture must be a Graduate in Agriculture of this University and must have been

engaged* in the practice of Agriculture or of work or research in connection with Agriculture for a period of at least three years after passing the examination for the degree of Bachelor of Agriculture.

- R. 142A.
- The candidate shall submit a certificate signed by the Teacher under whom he has worked stating that there is a *prima facie* case for the consideration of the thesis. Such certificate shall be regarded as satisfying the Board of Studies that the candidate has done sufficient work to enable him to appear for the Examination.
- R. 142B.
- Theses may be submitted at any time during the year. A candidate shall give notice of his intention to submit his thesis at least two months before the date on which he intends to submit the same. In such notice the candidate shall state the title of the thesis and the name of the University Professor, University Teacher or other recognized Teacher under whom he has worked, and he shall also indicate generally the nature of the results of his work. The candidate shall forward his thesis to the Registrar through his University Professor or University Teacher along with his form of application for admission to the Examination and a fee of Rs. 100.
- R. 142C.
- The Board of Studies shall suggest to the Academic Council the name of one referee who shall not be the University Teacher guiding the student who presents the thesis, to whom the thesis shall be submitted and who shall report through the Board to the Academic Council whether the thesis should be accepted in lieu of the whole or any part of the Examination for the Degree of Master in Agriculture. The report of such referee shall be final. If the referee recommends that the candidate shall be subjected to a further test, the Board shall communicate the nature of such test to the Academic Council who shall recommend the necessary Examiners to the Syndicate.
- R. 142D.
- A candidate shall submit five copies of the text of his thesis (with one set of preparations and diagrams, if any) together with a synopsis and statement indicating to what extent his work is original, and to what extent it is borrowed from others. The thesis shall be the candidate's own work carried out under the guidance or supervision of his Teacher.

(20A)—MASTER OF SCIENCE (AGRICULTURE).†

(For 1940 and subsequent years.)

- 0. 233.
- (a) Any person who has passed the Agricultural degree Examination of the University or the degree Examination of any other University recognized by this University which may be considered by the Academic Council equivalent to the Agricultural degree Examination of this University not less than two academical years previously and who has formally received the Agricultural degree and who has passed an examination in French or German as provided in

^{*} Subject to the provisions of Ordinance 74.

[†]The revised Ordinances and Regulations will apply to the M. Sc. (Agri.). Examination to be held in 1940, and subsequent years.

Chap. XXXIV]

M. SC. (AGRI.)

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Regulation 114 may be admitted to the examination for the degree of Master of Science, and should he pass the examination in any one of the branches, he will be admitted to the degree of M. Sc.

- (b) On a new application being forwarded and a fresh fee paid, a candidate who has already passed the examination in one branch may appear on a subsequent occasion in a different branch.
- Regulations relating to the degree of M. Ag., a person who was registered for the M. Ag. degree under the said Ordinances and Regulations before the passing of the Revised Ordinances and Regulations shall be deemed to have been registered for the M. Sc. (Agri.) degree by research alone and shall be admitted to all the privileges of a candidate who is registered for the M. Sc. (Agri.) degree by research alone under the Revised Ordinances and Regulations.
- R. 142A. The M. Sc. degree may be taken :—

(1) by research alone,

(2) by written examination and practical (where possible), or

(3) by research and examination combined.

- R. 142B. The candidate shall submit a certificate signed by the teacher under whom he has worked stating that there is a prima facie case for the consideration of the thesis. Such certificate shall be regarded as satisfying the Board of Studies that the candidate has done sufficient work to enable him to appear for the examination.
- R. 142C. The thesis may be submitted at any time during the year. A candidate shall give notice of his intention to submit his thesis at least two months before the date on which he intends to submit the same. In such a notice the candidate shall state the title of the thesis and the name of the University Professor, University Teacher or other recognized teacher under whom he has worked, and he shall also indicate generally the nature of the results of his work. The candidate shall forward his thesis to the Registrar through his University Professor or University Teacher along with his form of application for admission to the examination and a fee of Rs. 100.
- R. 142D. The Academic Council having before it the suggestion or suggestions of the appropriate Board of Studies, shall recommend to the Syndicate the names of suitable referees, none of whom shall be the University Professor or Teacher who has guided the student's work. When the Syndicate has appointed a referee, the Registrar shall forward the thesis to him. The referee shall consult the University Professor or Teacher who has guided the student's work and shall report to the University whether the thesis shall be accepted or rejected. The report of the referee shall be final. Every such report shall be circulated to the members of the relevant Board of Studies and placed before the Academic Council for information.
- R. 142E. A thesis that has been rejected may be submitted again after due revision and subject to the provisions of Ordinance 227.
- R. 142F. A candidate shall submit five copies of the text of his thesis (with one set of preparations and diagrams, if any) together with a synopsis

and a statement indicating to what extent his work is original and to what extent it is borrowed from others. The thesis shall be the candidate's own work carried out under the guidance or supervision of his Teacher.

- R. 1426. The Written Examination and Practical (where possible) referred to in R. 142 A (2) will comprise the following:—
 - 1. Agronomy
 - 2. Soil Science
 - 3. Agricultural Chemistry
 - 4. Agricultural Botany (Two courses: A. Plant Physiology and B. Plant Breeding)
 - 5. Plant Pathology
 - 6. Entomology
 - 7. Horticulture
 - 8. Agricultural Economics
 - 9. Animal Husbandry
 - 10. Dairy Science
- R. 142H.

 (1) A candidate for the M. Sc. degree by research shall first pass a Language Test in French or German and shall submit his thesis not less than two terms after passing the Language Test and not less than four terms after passing Agricultural Degree Examination. The Language Examination may be taken at any time after passing the S. Sc. (Agri.) Examination.
 - (2) The Language Examination Paper shall be of two hours' duration, and shall consist of a passage or passages for translation into English. The passage or passages shall be connected with the branch of Science offered by the candidate. Alternative passages pertaining to the different branches of Science shall be set to the candidates and shall deal with subjects of which some knowledge is to be expected of the Agricultural graduates. The use of a dictionary shall be allowed in answering the paper.
- R. 1421. On the recommendation of the Board of Studies, the Academic Council may from time to time prescribe or recommend text-books in the various subjects of this examination and modify from time to time as may be found necessary, the details of the theoretical and practical courses laid down for this examination.

By Written examination & practical, under R. 142A (2).

R. 142J. The syllabuses of subjects mentioned under 142G will consist of Lectures and practical work as detailed below subject by subject.

The student is expected to be conversant with up-to-date literature on his subject.

A complete record of practical work done during the course is to be maintained for submission to the Examiners. Chap. XXXIV] M. SC. (AGRI.): SOIL SCIENCE

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(1) AGRONOMY.

Paper I

Detailed study of the specific requirements of (i) climate, (ii) soil, and (iii) culture of any one of the following cropping systems:—

(a) Cotton, (b) sugarcane, (c) rice, and (d) a group of jowar, bajri and wheat.

Paper II

Detailed study of any one of the cropping systems mentioned under Paper I above from the points of view of (i) manurial requirements, (ii) varieties and their improvements, and (iii) marketing of produce up to and including the stage at which it leaves the hands of the grower.

Paper III

Farm organization relevent to the cropping system elected.

Agricultural experimentation; detailed study of the various important field experimentation methods and their comparison.

Practical Work

A detailed study of two selected units each of (a) peasant and (b) capitalistic farms relevant to the cropping system elected, with suggestions for improvement.

The student should conduct an experiment to determine the exact value of any one aspect of growth of any one of the crops elected.

(2) Soil Science

Paper I-Soil Physics

Mechanical composition of soils; moistures relationship in soils; soil atmosphere; soil temperatures; colloidal clay and its nature; physical properties of soil and methods of measuring them.

Soil Genesis. Mineral matter; organic matter and the pedogenic

Soil survey and classification including the historical development

Soil survey and classification including the historical development of the subject—different methods and their comparative merits. Soil groups of the world.

Application of soil physics to agriculture. Alkali soil problems; soil tilth and cultivation; land drainage and irrigation; use of green manures and fertilisers; dry farming.

Concept of soil heterogeneity. Methods of soil sampling. Statistics as applied to soil problems.

Paper II- Soil Chemistry

Inorganic constituents of soil and their properties; constitution of the clay fraction, and the present concept of soil colloids.

Base exchange phenomena; calcium, sodium and acid clays.

[Part II

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Acid and alkali soils, causes of formation and their reclamation.

Soil reaction. pH value, soil water, soil air, soil temperature: their relationship and influence on soils and plant growth.

Soil organic matter.

Changes taking place in soil constituents due to various agencies.

Principles of manuring. Decomposition and movement of manures in soil, effect on soil and plant, availability, residual effects.

Analysis of soils and interpretation of results.

Paper III-Soil Microbiology

Historical introduction to soil microbiology.

Occurrence and distribution of micro-organisms in soil and the dynamic nature of soil.

Classification of bacteria, fungi, algae, protozoa, etc. Conditions affecting their activities; energy relations, metabolism, etc.

Activities of the soil population and their influence on organic and inorganic soil constituents, soil properties and plant growth. Theory of humus formation.

Carbon and nitrogen cycles.

Study of specialised groups; azofication, ammonification nitrification, sulphofication, etc.

Soil as a medium for growth and activity of micro-organisms. Influence of environmental conditions, soil treatment, and plant growth on micro-organisms.

Soil sterilisation and soil inoculation; microbiological activity as index of soil fertility.

Practical Work.

Soil Physics.

Mechanical analysis of soil; determination of soil moistures; maximum water holding capacity, moisture equivalent, moisture at sticky point, moisture at wilting, moisture contents at different humidities; heat of wetting; separation of soil colloids; determination of the hydrogen ion concentration; conductometric and potantiometric titration of clay.

Examination of soil profiles; taking of soil monoliths; soil surveying and soil mapping.

Preparation of hydrogen, calicum and sodium soils and measurement of their physical properties such as shrinkage, swelling, breaking force, permeability and dispersion.

Measurement of soil tilth in the field.

Some of the experiments under paragraphs 1 and 3 above should be done in replicates and the data treated statistically.

Soil Chemistry:

Analysis of soils and waters including the determination of exchangeable bases, pH value of soils and lime requirement. Analysis of the clay fraction.

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Soil Microbiology:

Isolation, identification and cultivation of soil micro-organisms.

Determination of the biological activity of soils.

Determination of nitrification, ammonification, azofication, etc. in soils. Soil sterilisation and soil inoculation.

(3) AGRICULTURAL CHEMISTRY.

Paper I-Soil Chemistry

Inorganic constituents of soil and their properties; constitution of the clay fraction and the present concept of soil colloids.

Base exchange phenomena; calcium, sodium and acid clays.

Acid and alkali soils causes of formation and their reclamation.

Soil reaction, pH value, soil water, soil air, soil temperature: their relationship and influence on soils and plant growth.

Plant nutrients in the soil: their movements, availability and relation to plant growth.

Soil organic matter, carbon and nitrogen cycles; theory of humus formation.

Changes taking place in soil constituents due to various agencies.

Analysis of soils and interpretation of results.

Soil micro-organisms; specialised groups of micro-organisms such as nitrifying, nitrogen fixing, etc., their influence on soil fertility and plant growth.

Paper II-Chemistry of Plant Products, Manures and Manuring.

Detailed study of the chemistry of various plant constituents and plant products.

Enzymes, their classification and theory of action; study of important types of enzymes.

Chemical changes during germination, growth and ripening of plants, and during canning, storing and drying of fruits, vegetables, foods, etc.

Chemistry of fermentation of tea, coffee, cocoa, and retting of fibre; preparation of sugar, wine, vinegar, starches, gums, resins, oils, etc.

Principles of manuring. Manures, composition, decomposition, movement in soil, effect on soil and plant, availability, residual effects. Manure conservation, composting of refuse; sewage and its disposal. Analysis and valuation of manures.

Paper III-Chemistry of Animal Nutrition, Feeds and Feeding.

Chemistry of the animal body and the processes of digestion, absorption, respiration, excretion, and contraction. Energy relation. Constituents of food and their metabolism in the animal body, digestibility, biological value and starch equivalent.

EXAMINATIONS [Part II]

Balanced diet. Vitamins; energy and nitrogen equilibrium. Principles of feeding standards. Animal as a convertor of food and energy; comparative efficiency of farm animals.

Classification, production, composition, digestibility and utilization of various foods. Changes during ensiling, desiccating, etc., of

feeds.

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Manurial value of feeds.

Paper IV—Dairy Chemistry and Bacteriology

Chemistry of the constituents of milk and milk products. Adulteration.

Micro-organisms in milk; souring and coagulation; preservation of milk and milk products; cream and butter organisms; ripening of cheese.

Practical Work

Soil Chemistry:

Analysis of soils including the determination of exchangeable bases, pH value of soils, and lime requirement. Analysis of clay fraction.

Culture of bacteria from soil; isolation and study of important types. Study of ammonification, nitrification, etc.

Chemistry of Plant Products, Manures and Manuring:

Determination of inorganic plant constituents including minor elements. Isolation and estimation of fats, proteins and carbohydrates.

Enzymes, their isolation and study of a few important ones; changes during germination of seeds.

Analysis of manures, fertilisers and waters.

Chemistry of Animal Nutrition, Feeds and Feeding:

Analysis of various feeds, detection, and estimation of some common adulterants and animal poisons.

Vitamin assay.

Dairy Chemistry and Bacteriology

Analysis of milk and milk products. Detection of milk preservatives and adulterants.

Study of micro-organisms from milk and milk products.

(4) AGRICULTURAL BOTANY

Course A: PLANT PHYSIOLOGY

Paper 1

Development of the science of plant physiology. Critical study of protoplasm. Osmosis and a critical interpretation of its role in plant metabolism; study of methods for determination of osmotic pressure,

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their importance and limitations. Permeability, its role in plant processes; critical interpretations of results obtained by various methods.

Paper II

Antagonism. Nutrients. Water relations of plants. Photosynthesis. Respiration. Translocation.

Paper III

Irritability and tropic responses of plants. Growth phenomena. Physiology of sexual reproduction.

Practical Work

Experiments with respect to all the different aspects of plant physiology, with special reference to agricultural crops. Thorough acquaintance with the apparatus and their setting up for experimental work.

COURSE B: PLANT BREEDING

Paper I-Advanced Genetics

Detailed study of variation, heredity, mutation and evolution.

Paper II-Cytology as applied to Genetics

Relation of cytology to plant breeding. Chromosome theory of inheritance.

Paper III-Crop Breeding

History of plant breeding.

Principles and methods involved in selection and hybridisation including inbreeding and genetical aspect of selection for disease-resistance for the improvement of economic crops.

Acquaintance with the previous work in breeding of economic crops with particular reference to crops of the Bombay Presidency.

Practical Work

Carrying out plant breeding technique on one crop for a period of two seasons. Laboratory analysis of experimental data. Critical study of a number of best examples of genetical analysis to be found in periodical literature.

A good acquaintance with cytological technique and the instruments used therewith.

(5) PLANT PATHOLOGY

Paper I

Detailed study of the morphology and taxonomy of the higher Schizomycetes, Myxomycetes and Phycomycetes.

[Part II

Paper II

Detailed study of the morphology and taxonomy of the Ascomycetes, Basidiomycetes and Fungi Imperfecti.

Paper III

Applied Mycology:

History of plant pathology.

Phenomena of infection, susceptibility, host reactions and symptomatology.

Relation of environment to disease in plants.

Dissemination of fungi.

Principles and methods in plant disease control including breeding and selection for disease resistance.

Detailed consideration of important plant diseases caused by fungiand bacteria.

A brief account of plant viruses and the diseases caused by them.

Practical Work

Mycology: practice in the collection and identification of fungi; preparation and utilisation of mycological exsiccata.

Applied mycology: methods of investigation of different groups of plant diseases; composition and preparation of fungicides; surveys and estimates of crop losses.

(6) AGRICULTURAL ENTOMOLOGY

Paper I-General Entomology

Advanced knowledge of the morphology, anatomy and physiology of insects of agricultural importance.

Classification of insects and the principles on which it is based.

Habits of typical insects of the various families.

Paper II-Binomics of Insects

Life history and habits of:

(a) Insects and animals injurious to crops.

(b) Bees, silk and lac insects—producing valuable commercial products.

Paper III-Applied Entomology

Detailed history and present position of methods of control of injurious insects; appliances employed in the control of insect; insecticides, their preparation and doses used in the control of insect pests.

Knowledge of ecology of insects of agricultural importance; prevalence and importance of each of the pests in various parts of India.

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Practical Work

Dissection of insects; preparation of permanent slides; methods of investigation of pest; rearing 3 typical insects from each of the two classes (1) Holometabola and (2) Heterometabola: identification of insect pests and symptomatology of affected plants; classified collection of insects of agricultural importance in the Bombay Presidency; spraying and dusting machinery, and other appliances; composition and preparation of insecticides; control of insect and animal pests; surveys and estimates of crop losses.

(7) Horticulture.

Paper I-Propagation and Floriculture.

Propagation and Nursery Management: seed selection and storage: principles underlying vegetative propagation methods of propagation and management of nursery.

Floriculture; designing of beds, planting and care of flower plants, training of hedges; cultivation of commercial flowers; principles of landscape gardening.

Paper II-Pomology

Principles of fruit culture; detailed study of important fruit crops-Laying out and managing experimental plots and interpretation of results.

Paper III-Fruit Preservation

Principles of canning, drying, salting and cold storage.

Practical Work

Preparation of an album containing specimens of common ornamental plants with their botanical names and other important description.

Different methods of propagation, manuring pruning training, etc.

Record of field observations, statistical interpretation of experimental data. Record of experiments on fruit and vegetable canning, and preserves.

(8) AGRICULTURAL ECONOMICS

Paper I-General Economics

Production:

Factors of production, their organisation and combination. Laws of increasing and diminishing returns. Large scale production, pools, cartels and trusts.

Consumption:

Utilities and goods. Law of diminishing utility; marginal utility theory. Laws of demand.

Exchange:

Theory of value. Market value and price. Money, coinage quantity theory, price trends, systems of currency. Credit and Banking. Theory of exchange. International trade.

[Part II

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Distribution:

National dividend and its distribution. Rent, Wages, Interest and Profits. Socialism.

Public finance:

Revenue and expenditure. Principles of taxation. Public debt.

Paper II—Indian Economics & Statistics

Nature and importance of history of economic thought, its underlying philosophies, methods of approach—inductive, deductive, statistical.

Economic history of India. Development of Agriculture, Industry, Commerce and Transportation, especially from the establishment of the British Rule to the present time. Decline of indigenous industries, loss of economic equilibrium, problems raised by the economic evolution in India.

Economic problems of the Bombay Presidency including problems of interest to public departments, legislature and industries.

Population, birth rate, death rate, movement of population in the country.

Caste system, joint family, laws of property, succession and inheritance.

Roads, railways, cannals: their policy.

Indian currency system, Indian Banking, Reserve Bank, Exchange Banks, Joint Stock Banks, Co-operative Banks, Post Office Banks.

Indian finance: central, provincial and local revenue and expenditure; public debt. Taxable capacity of the people.

Nature and uses of statistics, sources, acquaintance with analysis, compilation, presentation and interpretation of data.

Paper III—Agricultural Economics

Factors of production:

Land as a basis of agricultural production; influence of rainfall and climate; possibilities of increasing land. Division and fragmentation. Land policy and land tenures.

Farm labour, supply, reasons for scarcity, efficiency and wages, adjusting farm enterprises to labour supply and labour efficiency. Standard of living. Family budgets.

Capital, different forms of agricultural capital, lack of capital. Agricultural credit, kinds, sources and uses. Stock and equipment, their depreciation. Principles of agricultural co-operation, organisation and management of societies and unions.

Law of variable returns, combination of the grades and proportions of factors of production.

Farm management:

Selection of farms; geographic factors, agricultural regions; size of enterprise; types of farming; choice of crops and livestock. Competitive

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and supplementary crops, specialised and diversified farming, cropping schemes. Income measures used in different countries including India: farm-business-income, family-labour-income and net profit.

Marketing:

Development of marketing. Marketing services, agencies and methods. Price factors, commodity exchanges. Marketing costs. Current marketing problems in relation to co-operative marketing.

Practical Work.

Acquaintance with all the economic problems of the agriculturists of any one village and submission of the records in the form of a paper.

(9) Animal Husbandry. Paper I—Breeding.

Origin and domestication of farm animals

Genetic principle and their application.

Breeding plans based on selection and relationship.

Topics bearing on breeding plans: relative importance of sire and dam; herd registration; evaluation of sire's or dam's hereditary transmission; organization for improvement.

Reproduction, artificial insemination, rejuvenation; lactation.

History of breeds: formation, development and improvement. Indian breeds of live-stock; Shorthorn cattle and Leicester sheep in Great Britain and Arab horse in Arabia.

Breeding as a business enterprise. Co-operation, community breeding, State and other organizations for the promotion of live-stock industry.

Biometry; principles and methods including analysis of variance—genetic and otherwise,—co-efficient of inbreeding and relationship.

Paper II Chemistry of Animal Nutrition, Feeds, and Feeding.

Chemistry of the animal body and the processes of digestion absorption, respiration, excretion and contraction. Energy relation. Constituents of food and their metabolism in the animal body, digestibility, biological value and starch equivalent.

Balanced diet. Vitamins; energy and nitrogen equilibrium. Principles of feeding standards. Animal as a convertor of food and energy; comparative efficiency of farm animals.

Classification, production, composition, digestibility and utilisation of various feeds. Changes during ensiling, desiccating, etc. of feeds.

Manurial value of feeds.

Paper III-Animal Judging and Management

Principles and practices of judging.

Animal management for various purposes and under various conditions in general and in India in particular, and suggestions for improvement in India.

Maintenance of health; protection against diseases—contagious, infectious and ordinary disturbances—and their treatment including medicine and diet.

Nutritive requirements of the animal body for milk production, for growth, for fattening, for work, for egg and for wool.

Malnutrition and nutritional diseases.

Different practices of feeding animals in India, Germany and U. S. A. in general and in the Bombay Presidency in particular. Suggestions for improvement in the Bombay Presidency.

Plans for the provision of roughages under various conditions including famine.

Practical Work.

Breeding:

Study and management of pedigree herds and flocks; maintenance and interpretation of records and suggestions for improvement.

Exercises in biometry.

Chemistry of Animal Nutrition, Feeds and Feeding:

Analysis of various feeds; detection and estimation of some common adulterants and animals poisons.

Vitamin assay.

Animal Judging and Management:

Methods of feeding; compounding of rations, making up rations, making of silage and hay, preparatious of feeds. Feed costs of various animals.

Comparative study of typical specimens or various breeds of livestock used for different purposes.

Making score cards of typical breeds of livestock for various purposes in India.

(10) DAIRY SCIENCE

Paper I-Dairy Products and Technology

Dairy products.

Technology of dairy products including milk, cream, butter, loni, khawa, curd, buttermilk, ghee, cheeses of different types, condensed milk, evaporated milk, milk powders, lactose and lactic acid casein; homogenisation of Milk, humanised milk, pasteurisation of milk, different grades of milk.

Paper II-Dairy Chemistry and Bacteriology

Chemistry of the constituents of milk and milk products. Adulteration.

Micro-organisms in milk; souring and coagulation; preservation of milk and milk products; cream and butter organisms; ripening of cheese.

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Paper III-Dairy Management and Machinery

Dairy sanitation and hygiene. Present methods of handling milk and its products and suggestions for improvement.

Dairy management including accounts.

Machinery and management of Dairy plants.

Laws passed in connection with milk production and disposal.

Scope for developing dairy industry. Co-operative dairying.

Practical Work

Dairy Products and Technology:

Preparation and preservation of milk and its products.

Dairy Chemistry and Bacteriology:

Analysis of milk and milk products. Detection of milk preservatives and adulterants.

Study of micro-organisms from milk and milk products.

Dairy Management and Machinery

Practical work at a place or places approved by the University where the various products mentioned above are manufactured. The student shall obtain certificates to the effect that he has undergone satisfactory training.

R. 142K.

The Examinations shall consist of papers and practicals as detailed in syllabuses under R. 142J and carry marks as set forth below :-

Full marks 300

Papers

Three papers, each of three hours and carrying 100 marks, in all subjects except Agricultural Chemistry, Animal Husbandry and Dairy Science.

Agricultural Chemistry: 4 papers, each carrying 75 marks.

Animal husbandry: Paper I of 125, Paper II of 75, and Paper III of 100 marks.

Dairy Science: Paper I of 125 marks, Paper II of 75 marks, and Paper III of 100 marks.

Practical work

	200
In all subjects	In Agrono-
except Agro-	my and
nomy and	Horticulture.
Horticulture.	

Practical work carried out and records maintained thereof during the course, to be assessed by the subject to Professor in charge, review by the Examiners.

100 150 100 50

Practical and viva voce at the time of the examination.

One of the examiners shall be the Professor responsible for the teaching of the subjects.

By research and examination combined, under R. 142A (3).

R.142KK.

- (i) A. The amount of teaching for the Examination Part (hereinafter called Part A) shall be six credits for two academic years, one credit meaning one lecture period or one period of three hours of practical work per week per term: the subjects will be treated in a less detailed manner than for M.Sc. in Agriculture by Examination only.
 - B. The Research Part (hereinafter called Part B) will be represented by a thesis embodying the results of an investigation on some topic or topics in the subject elected for the Examination Part, carried out under the guidance of a recognized Post-graduate Teacher.
- (ii) The examination shall consist of two papers, each of three hours' duration, and a practical examination which will occupy not less than three and not more than six hours. In subjects in which a practical examination is not required, there shall be three papers. Each paper or a practical examination will carry 100 marks.
- (iii) The thesis on the research work of the candidate and the application for appearing for the examination should be sent to the University Registrar, accompanied by a certificate from the University Teacher to the effect that the candidate has satisfactorily completed the course, and countersigned by the head of the institution at which the course is taken.
- (iv) The same examiners will examine both Parts A and B of each subject. One of the Examiners shall be the University Teacher in charge of the subject.
- (v) The written and practical examinations will be held at the end of each term.
- (vi) The candidate will be declared to have passed the examination for the degree of Master of Science (Agriculture) when he has passed in both the parts either at one time or at different times.
- (vii) A thesis on research work that has been rejected may be resubmitted after substantiation by further work duly certified by the University Teacher.
- (viii) The syllabuses for the Examination Part in subjects mentioned under R. 142 G are as detailed below:—

1. AGRONOMY.

Paper I

The specific requirements of :-

(i) Climate, (ii) soil, (iii) culture, (iv) seed and its preparation, (v) manure, and (vi) the method of harvest and marketing the produce up to and including the stage at which

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it leaves the hands of the grower, of any one of the following cropping systems:—

(a) Cotton, (b) sugarcane, (c) rice, and (d) a group of jowar, bajri and wheat systems.

Paper II

- (a) The varieties of the crops and their improvements under any one of the cropping systems mentioned under Paper I.
 - (b) Farm organisation relevant to the cropping system elected.
- (c) Study of the various important field experimental methods and their comparison.

Practical Work.

A detailed study of one selected unit each of :-

(a) Peasant and (b) capitalistic farms relevant to the cropping systems elected.

2. SOIL SCIENCE.

Paper I-Soil Physics.

Soil formation and genesis, soil classification, soil survey and its utility.

Various methods of mechanical analysis, their limitations and scope, soil separates.

Single value soil constants.

Air and water in soil, their relation with temperature.

Influence of physical properties on cultivation, tilth, plant growth etc.

Soil colloids, their composition, properties, etc.

Clay fraction, its constitution, etc.

Base exchange, soil reaction and pH value; their influence on soil and plant growth.

Paper II—Soil Chemistry and Microbiology.

Soil constituents, changes taking place in soil constituents due to various agencies.

Plant nutrients, available and non-available; soil solution; their relation to plant growth.

Organic constituents of soil, their composition, properties, and importance to plant growth.

Occurrence and distribution of micro-organisms in soil, their classification, activities and influence on soil and plant.

Carbon and nitrogen cycles.

Study of specialised groups, azofication, ammonification, nitrification, etc.

Influence of various factors on soil micro-organisms.

Soil analysis, discussion of methods and interpretation of results.

[Part II

Practical Work.

Chemical and mechanical analysis of soils including the determination of exchangeable bases, pH value, lime requirements and available plant food constituents. Analysis of soil organic matter and humus.

Study of soil morphology and soil profiles; soil survey and mapping. Determination of single value soil constants.

Isolation, identification and cultivation of soil micro-organisms. Determination of the biological activity of soils.

3. AGRICULTURE CHEMISTRY

Paper I-Chemistry of Soil and Manures.

Inorganic constituents of soil, their composition, properties and importance to plant growth.

Soil reaction, base exchange, acid and alkali soils.

Plant nutrients, soil solution; their relation to plant growth.

Organic constituents of soils, their composition, properties and importance to plant growth.

Soil micro-organisms, specialised groups of micro-organisms, carbon and nitrogen cycles.

Manures, their composition, decomposition, movement and availability in soil, their effect on soil and plant.

Analysis of soils and manures, the interpretation of results.

Paper II—Chemistry of Plant Products, Dairy Products and Foods and Feeding.

Important plant constituents, their composition and formation.

Enzymes, their classification and action.

Changes during germination, plant growth and ripening of fruits, and during storage of vegetables, fruits and foods.

Milk and dairy products, their composition, adulteration and preservation; micro-organism in milk and dairy products.

Chemistry of the animal body and of the processes of digestion, absorption, excretion and respiration.

Foods, their constituents, metabolism, digestibility, biological value and starch equivalent.

Feeding standards, balanced diets, energy and nitrogen equilibrium.

Practical Work.

Chemical and mechanical analysis of soils including the determination of exchangeable bases, pH value, lime requirements, studies on ammonification and nitrification.

Analysis of manures, fertilisers and irrigation waters.

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Analysis of plant materials for their organic and inorganic constituents; enzymes and their isolation.

Analysis of foods and feeding stuffs, detection and estimation of common adulterants.

Analysis of dairy products, detection and estimation of adulterants and preservatives.

4. AGRICULTURAL BOTANY.

Course A:-Plant Physiology.

Paper I.

Brief history of Plant Physiology. Physical and chemical properties of protoplasm and its functions. Phenomenon of osmosis and its relation to metabolic activities of plants. Permeability, water absorption and transpiration. Absorption of nutrients and translocation.

Paper II.

Study of the following vital phenomena:-

Photosynthesis, respiration, growth, irritability and reproduction.

Practical Work.

Suitable experiments to illustrate the portion covered in theory.

Course B :- Plant Breeding.

Paper I-Genetics & Cytology.

Study of variation, heredity, mutation and evolution. Cytology in relation to plant breeding.

Paper II-Crop Breeding.

- (a) Study of technique employed in selection and hybridisation and the scope of these practices.
- (b) Study of the work done and results obtained on economic crops of the Bombay Province.

Practical Work.

Field and laboratory work in plant breeding. Biometrical analysis of experimental data. Practice in cytological technique.

5. PLANT PATHOLOGY.

Paper I.

Taxonomy and morphology of slime moulds and fungi (Phycomycetes, Ascomycetes, Basidiomycetes and fungi Imperfecti) treated in a general manner.

Paper II

This course will deal with the following (in a general manner):-

(i) History of Plant Pathology;

(iii) The phenomena of infection, susceptibility, host reactions and symptomatology;

(iii) Relation of environment to disease in plants;

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(iv) Dissemination of fungi;

(v) Principles and methods in plant disease control including breeding and selection for disease resistance; and

(vi) A detailed consideration of important plant diseases caused by fungi and bacteria and those of virus origin.

Practical Work

Practice in the collection and identification of fungi; preparation and utilisation of mycological exsiccata.

Methods of investigation of different groups of plant diseases; composition and preparation of fungicides; surveys and estimates of crop losses.

6. AGRICULTURAL ENTOMOLOGY.

Paper I

General knowledge of the morphology, anatomy, and physiology of insects of agricultural importance.

The life histories and habits of :-

(a) Insects and animals injurious to crops.

(b) Bees, Silk and Lac insects producing valuable commercial products.

Paper II

Classification of insects and principles on which it is based.

Habits of typical insects of the various families of agricultural importance.

The general history and present position of methods of control of injurious insects. The appliances employed in the control of insects. Insecticides, their preparation and doses used in control of insect pests.

Knowledge of ecology of insects of agricultural importance; prevalence and importance of each of the pests in various parts of India.

Practical Work

Dissection of insects. Preparation of permanent slides. Methods of investigation of pests. Rearing 3 typical insects from each of the two classes (1) Holometabola and (2) Heterometabola. Identification of insect pests and symptoms of affected plants. Classified collection of insects of agricultural importance of the Province of Bombay. Spraying and dusting machinery, and other appliances. Composition and preparation of insecticides. Control of insect and animal pests. Surveys and estimates of crop losses.

7. HORTICULTURE

Paper I-Pomology

Principles underlying vegetative propagation, different methods of propagation and nursery management. Principles of fruit growing. Study of important fruit crops. General knowledge of recognition and control of pests and diseases.

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Paper II-Fruit Preservation

Principles of fruit and vegetable canning, extraction, bottling and preservation of fruit juices, fruit preserves, drying and candying of fruit.

Practical Work

Field and laboratory work in connection with different methods of propagation, manuring, pruning, etc.; fruit and vegetable canning, preserves, etc.

8. AGRICULTURAL ECONOMICS

Paper I

Factors of production, their organisation and combination. Laws of increasing and diminishing returns. Law of variable returns. Combination of grades and proportions of factors of production.

Utilities and goods. Law of diminishing utility, marginal utility theory. Law of demand.

Property and contract, private property. Law of property.

Theory of value. Subjective value, market value and price. Money and coinage, quantity theory, level of prices, system of currency. Credit and Banking.

Indian currency and banking systems. Theory of exchange. International trade.

National dividend and its distribution. Rent, Wages, Interest and Profits. Farm Business Income, Family Labour Income, Entrepreneur's surplus.

Indian revenue and expenditure. Principles of taxation. Public debt.

Methods of approach—inductive, deductive and statistical.

Paper II

Development of agriculture, industry and commerce. Transportation and communication.

Industrial evolution in England. Mechanical inventions. Industrial and agricultural changes in India. Evils of transition. Natural resources other than agriculture.

Growth of population, migratory population, movement of population.

Standard of living. Family budgets.

Caste system, joint family system, succession and inheritance.

Ownership of land and tenancy. Division and fragmentation. Possibilities of increasing agricultural land. Land policy.

Size of enterprise. Adjustment of farm enterprises to labour supply and labour efficiency. Forms of agricultural capital.

Market, retail and wholesale distribution. Marketing and its functions; transport, communication, storage, standardisation, market

risk, market news and market finance. Market price. Co-operative marketing. Cost of marketing. Relation of State to marketing.

Practical Work

Acquaintance with economic problems of the agriculturists of any one village and submission of record in the form of a paper.

Compilation, presentation and statistical interpretation of agricultural data.

9. ANIMAL HUSBANDRY

Paper I-Animal Breeding

Origin and domestication of farm animals.

Genetic principles and their application.

Breeding plans based on selection and relationship.

Principles of breed study and judging.

History of breeds: formation, organisation and present development of Shorthorn cattle and Leicester sheep in Great Britain and of any two Indian breeds of live-stock.

Animal improvement in India.

Biometry: principles and methods including analysis of variance—genetic and otherwise—co-efficient of inbreeding and relationship.

Paper II-Animal Nutrition and Management

Chemistry of the animal body and the processes of digestion, absorption, respiration, excretion and contraction.

Classification, composition, digestibility and utilisation of various feeds. Manurial values of feeds.

Balanced diet. Feeding standards; their history and use in feeding practice including making up of rations and evaluating the local practices of feeding.

System of live-stock management in health and against deadly form of diseases.

Practical Work

- (i) Analysis of pedigree records and results of mating and their biometrical inference.
- (ii) Analysis of animal form with respect to purity or otherwise of a breed and an individual (from functional stand-point) and preparation of Animal Husbandry Schemes.
- (iii) Analysis and evaluation of various feeding practices and experiments and their biometrical inference. Preparation of fodder and feeding stuff schemes.

10. DAIRY SCIENCE

Paper I-Dairy Products and Technology

Milk: secretion, properties and sanitary handling with respect to production, hygiene and nutritive value. Homogenization of milk, humanized milk and grades of milk.

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Milk products: their technology, manufacture, handling, storage and nutritive value.

(a) Cream, butter, cheese and ice-cream.

(b) Curd, butter-milk, country butter, khawa and ghee.

(c) Casein, condensed milk and milk powder.

Paper II-Dairy Chemistry, Bacteriology and Machinery

- (i) Dairy chemistry, Constituents of milk and milk products and adulteration.
- (ii) Dairy bacteriology. Microorganism in milk and milk products and their action and control of conditions affecting their development.
- (iii) Dairy sanitation and hygiene. Methods of handling milk and milk products, supply, management (records and accounts). Laws and regulations.
 - (iv) Dairy machinery and its management.

Practical Work

- (i) Manufacture, judging and grading of milk products.
- (ii) General chemical and bacteriological examination of milk and milk products, and record and preparation of Dairy schemes.

BACHELOR OF ENGINEERING.

GENERAL.

- A candidate for the Degree of Bachelor of Engineering must produce a certificate showing that he has passed the Intermediate Examination in Science of this University with Mathematics as his optional subject or the Intermediate Examination in Science of a University recognized by this University in the group of Mathematics, Physics and Chemistry or a certificate of having passed the Intermediate Arts Examination with Mathematics as the optional subject and the B. A. Examination with Physics and Chemistry as the Optional group.
- O. 236. A candidate will be required to pass three examinations: the first, to be called the First Examination in Engineering; the second, the Second Examination in Engineering (Civil, or Mechanical and Electrical); and the third, the Examination for the Degree of Bachelor of Engineering (Civil, Mechanical or Electrical).

(21).—FIRST EXAMINATION IN ENGINEERING.

Admission.

No candidate will be admitted to this examination unless he produces satisfactory testimonials of having kept two terms in a College in Engineering recognized by the University of Bombay.

R. 143. Candidates will be examined in the Subjects I to V, and VII to VIII specified below. Each candidate must, however, produce a certificate from the Principal of his College that he has satisfactorily

completed the course prescribed in Subjects I to VIII. Details of the courses in each subject will be specified from time to time by the Academic Council on the recommendation of the Board of Studies.

I.—Mathematics. (One paper of 100 marks.)

II.—Mechanics. (One paper of 100 marks.)

III.—Heat Engines. (One paper of 100 marks.)

IV.—Surveying. (One paper of 100 marks: 50 marks for the term work.)

V.—Drawing. (One paper of 100 marks: 50 marks for term work drawings.)

VI.—Workshop Practice. (College Certificate only.)

VII.—Engineering Materials. (One paper of 100 marks.)

VIII.—Electrical Engineering. (One paper of 100 marks.)

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F. E.

R. 144.

I.—Mathematics—(One Paper.) (100 Marks.)

Practical Mathematics :-

Practical applications of plane trigonometry.

Solution of equations by graphs; determination of laws from numerical data by graphic methods.

Elements of Vector Algebra (up to product of two vectors only).

Calculus :-

Tangents and normals (Cartesian co-ordinates); maxima and minima of functions of a sigle variable. Rectification of plane curves. Mensuration of the surfaces and volumes of solids of revolution. Double integration. Centres of gravity; Pappus' Theorem. Moments of inertia; kinetic energy of a rigid body rotating about a fixed axis. Centres of pressure. Motion in a straight line with constant acceleration; simple harmonic motion; conservation of linear momentum; impact (simple cases only); projectiles; motion in a circle.

R. 145.

II.—MECHANICS—(One paper.) (100 Marks.)

Force, mass, weight, etc., time and space action of a force; equation of motion, work, power, graphic representation, friction, effect of friction, work against friction, efficiency of machines, mechanical advantage.

Energy of a rotating body, moment of inertia and radius of gyration.

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Mechanism of the reciprocating engine; turning moment effect of inertia; fly wheels, governors.

Straight line motions; wheel train; lathe gears; winch; weston and other geared pulley blocks.

Coil frictions; belt and rope driving; spur and bevel gearing.

Inclined planes, screw and worm gearing.

Epicyclic gears.

Stresses in simple framed structures, Force and link polygons. jib crane and simple roof truss.

Parallel forces, reactions on supports of beams.

Fluid pressure; total pressure and centre of pressure, floatation, hydraulic press and accumulator.

Graphic statics of simple frames.

Note.—Each candidate must produce a certificate from the Principal of his College that he has completed a practical course based on the examination course as laid down above and handed in a journal containing a full record of his laboratory work.

146. R.

III.—HEAT ENGINES.—(One Paper.) (100 Marks.)

Solid, liquid and gaseous fuels, their utilization and value for different purposes. The Bomb and Junker calorimeters.

Units of heat and units of work.

Lubricants and lubrication.

Effects of heat on solids, liquids and gases; isothermal and adiabatic expansions.

Properties of steam; sensible and latent heat; absolute pressure, superheating and vacuum; expansive working of steam.

Boilers: principal types and essential features of those in ordinary use.

Elements of steam, gas, oil and petrol engines and their details.

Diagram of work; the simple indicator; indicated and brake horse powers.

Note.—Each candidate must produce a certificate from the Principal of his College that he has completed in a satisfactory manner a practical course based on the above examination course and handed in a journal containing a full record of his year's work.

R. 147.

IV.—Surveying (One Paper.)

100 Marks and 50 Marks for the term work.

Surveying-General principles of surveying; determination and plotting of position; scales and representative fraction; degree of accuracy required. Simple chain and tape surveying; optical square; cross staff; clinometer; field book; check measurements.

Sources and amounts of error; accuracy obtainable.

Prismatic compass, its construction and use; surveying with compass and chain; surveying telescope and the bubble tube. "Y", Dumpy and reversible levels; their construction, handling and setting up. Temporary and permanent adjustments.

Reading the staff.

Principles of levelling and methods of recording. Levels; check levels; level book; bench marks; standard datum; assumed datum; longitudinal and cross sections. Checking work. Plotting levels, cross sections, and survey plans. Plane table; use of simple types; positions by intersection, resection and interpolation; precautions and accuracy of work.

Simpson's Rule and prismoidal formula and determination of areas and volumes.

Practical work during the terms.

Field work and survey drawings.

Measurement of land with cross staff.

Simple chain and tape survey.

A prismatic compass and chain survey.

A plane table traverse.

A line of levels and cross sections.

Note.—Each candidate must produce a certificate from the Principal of his College that he has handed in a complete and satisfactory set of drawings and field books on the above subjects, executed by himself within the walls of the College. The drawings and field books shall be submitted to the Examiners and allotted marks up to a maximum of 50.

Once a set of drawings and field books have been submitted for examination and marked, that marking shall be carried on to subsequent examinations unless new drawings and field books are presented. A candidate whose marks in surveying are thus carried over shall be eligible for a class.

R. 148.

V.—Drawing (One Paper.)

100 Marks and 50 Marks for term work drawings.

Machine Sketching—Freehand sketches of simple machine details, including riveted joints, screws, bolts, nuts, keys, shafts, shaft couplings, hangers and bearings, for shafts and pulleys. Stuffing boxes. Screw jack.

Machine Drawing—Drawing to scale the objects stated above. Projection of plan, elevation and end view from each other. Conversion of an isometric drawing to an orthographic one.

Plane Geometry—Simple problems in the construction of plane figures. Scales plain and diagonal. Areas. Loci. Proofs will not be required.

Solid Geometry—Projections of points, lines, and planes. Simple solids such as prisms, pyramids, cylinders and cones. Sections on

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different planes of a solid. Inter-penetration of simple solids including the cylinder and cone.

Model Drawing—Models of a collection of simple objects with proper pencil shading.

Isometric Projection—Drawing to isometric scale, simple objects such as joints used in carpentry work, pyramids, prisms and cylinders.

Note.—Each candidate shall submit a set of drawings and sketches certified by the Principal of his College that they have been executed in a satisfactory manner within the walls of the College. These drawings and sketches shall be submitted to the examiners and shall be allotted marks up to a maximum of 50.

Once a set of drawings has been submitted for examination and marked, that marking shall be carried on to subsequent examinations unless new drawings are presented. A candidate whose marks in Drawing are thus carried over shall be eligible for a class.

R. 149.

VI.-WORKSHOP PRACTICE.

(College Certificate Only.)

Carpentry—Names, use and setting of hand tools. Construction of halved joints, single mortise, tennon joint, mitre joint, dove tail, single oblique mortise and tennon joint, rafter joint.

Fitting—Names, use and setting of hand tools. Chipping cast iron, face and cross cuts; filing square and hexagonal prisms; callipers inside and outside; centre punch.

Forging—Names, use and setting of hand tools. Dowel pin, ring, figure 8, flat bend, edge bend, upsetting and swaging.

[Each candidate must produce a certificate from the Principal of his College that he has completed in a satisfactory manner a practical course on the lines laid down from time to time by the Board of Studies.]

R. 150.

VII.—Engineering Materials (One Paper).

(100 Marks.)

Stones, their varieties, and uses. Quarrying and dressing of stones.

Selecting clay, moulding and burning of bricks in kilns. Bull's and Hoffman's kilns. Bricks and tiles. Durability of the above, and measures adopted for their preservation.

Paints and varnishes.

Metals. Iron, cast iron, malleable castings, wrought iron. Steel and its properties, including hardening, tempering, etc. Other structural metals and alloys.

N. B.—Questions of Geology and the Chemistry of paints will not come into this.

Limes, hydraulic and fat, collection, burning, and slaking. Portland cement, preparation, tests for quality and uses. Mortars, asphalt, and bitumen.

Wood, sapwood, heartwood.

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[Part II

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Faults, felling, seasoning, durability, preservation and destruction. Principal uses.

R. 151.

VIII.—ELECTRICAL ENGINEERING (One Paper.)

(100 Marks.)

Electric and magnetic laws, units and standards. Electric and magnetic properties of materials. Electric and magnetic circuits and measurements. Measuring instruments and their calibration. Electromagnetic induction. Elementary theory of alternating currents. Inductance. Capacity. Power and power factor in a. c. circuits.

Elementary principles of direct current generators and motors. Characteristics and uses. Starters and regulators.

Elementary principles of alternating current generators, single and three phase. Star and delta connections. Power in a single or three phase system.

Elementary principles of single and three phase synchronous motors, induction motors and transformers, characteristics and uses.

Interior wiring systems—accessories, distribution boards. Wiring circuits. Wiring rules. Wiring for domestic appliances. Consumer's services.

Interior and street lighting—photometric terms and units. Principles of street lighting. Lighting schemes for residences and public buildings.

Secondary batteries—installation and maintenance.

Lightning conductors-erection and testing.

Laboratory Work-Measurement of lightning conductor and earth resistances.

Measurement of armature and field resistances. Measurement of insulation resistance of cables, installations and machines.

Determination of Joule's equivalent. Fuses. Temperature rise of field coils.

Calibration of ammeters, voltmeters and wattmeters.

Magnetic pull in a solenoid. Magnetisation curve.

Measurement of candle power and efficiency. Effect of voltage on luminous intensity.

Secondary cells. Motor starters.

Simple wiring exercises.

Note.—Each candidate must produce a certificate from the Principal of his College that he has completed in a satisfactory manner the above laboratory course and handed in a journal containing a full record of this laboratory work.

R. 152.

Regulation 152 has been dropped.

R. 153.

On the recommendation of the Board of Studies, the Academic Council may, from time to time prescribe or recommend text-books in the various subjects of this examination and modify from time to time, as may be found necessary, the details of the theoretical and practical courses laid down for this examination.

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S. E. (CIVIL) : ADMISSION

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Standard for Passing the Examination.

- of the full marks in Mathematics, 40 per cent. in each of the other subjects and 45 per cent. of the total marks obtainable. The minimum of 40 per cent. for a pass must be obtained separately in the written examination and term work in each subject. Those of the successful candidates who obtain 60 per cent. of the total marks obtainable will be placed in the First Class.
- R. 155.

 A candidate who has obtained 45 per cent. of the total marks in Mathematics, or who has obtained 50 per cent. of the total marks in any of the other subjects, will at his option, be excused from appearing in that subject at a subsequent examination and will be declared to have passed the whole examination when he has passed in all the subjects of the examination; Provided that in the subject or subjects in which he appears on the last occasion he must obtain the minimum in each subject together with the percentage of the total marks in such subject or subjects required by Regulation 154. Candidates passing the examination in this manner in compartments will not be eligible for a class or for any prize or scholarship to be awarded at the examination.
- R. 156. Candidates who fall short of the minimum required to pass under one head by not more than three per cent. and who obtain an aggregate of at least 55 per cent. of the total marks obtainable shall on the recommendation of a majority of not less than two-thirds of the Examiners present at the final meeting, be declared to have passed the examination.

(22).—SECOND EXAMINATION IN ENGINEERING (CIVIL).

Admission.

- 0. 238. No candidate will be admitted to this examination unless he produces satisfactory testimonials of having kept two terms in a College recognized in Civil Engineering by the University of Bombay subsequently to passing the First Examination in Engineering.
- O. 239. A student who has passed in all subjects but one at the F. E. Examination in conformity with Regulation 155 will be allowed to keep terms and appear for S. E. (Civil) Examination after keeping two terms, but will not be declared to have passed the S. E. Examination under any circumstances, unless he has passed in the remaining subject of the F. E. Examination held either in a previous, or in the same examination season.
- R. 157. Candidates will be examined in subjects I and II, and IV to VIII specified below. As regards subject III there will be no University Examination therein. Each candidate must, however, produce a certificate from the Principal of his college that he has satisfactorily completed the course prescribed in this subject. Details of the courses in each subject will be specified from time to time by the Academic Council on the recommendation of the Board of Studies.

I.—Calculus. (One paper of 100 marks.)

II.—Strength of Materials. (One Paper of 100 marks.)

III.—Materials Testing Laboratory. (College Certificate only.)

IV.—Building Construction. (One Paper of 100 marks.)

V .- Civil Engineering. (One Paper of 100 marks.)

VI.—Surveying. (One Paper of 100 marks; and a practical examination of 50 marks.)

VII.—Drawing and Design. (Drawing 100 marks; Oral and sketching 50 marks.)

VIII.—Geology. (One Paper of 100 marks and a practical examination of 50 marks.)

R. 158.

On the recommendation of the Board of Studies, the Academic Council may, from time to time prescribe or recommend text-books in the various subjects of this examination and modify from time to time, as may be found necessary, the details of the theoretical and practical courses laid down for this examination.

Syllabus.

S. E. (CIVIL.)

R. 159.

I.—CALCULUS—(One Paper.)

(100 Marks.)

Calculus.—Partial differentiation and its application to the theory of small errors and residuals. Taylor's and Maclaurin's theorem. Maxima and minima of function of two variables connected by one equation of condition. Curvature (Cartesian co-ordinates). Fourier's series (without proof). Theorem on mean values of a function f(x) as x takes all values from a to b.

Differential equations of the first order; simple linear differential equations of the second order. Equations of free and forced vibrations.

R. 160.

II.—STRENGTH OF MATERIALS—(One Paper.)

(100 Marks.)

(Subject to be treated, wherever possible, both analytically and graphically).

Stress; strain; elastic limit; elastic constants; resolution of stress; ellipse of stress; principal stress and planes; principal strains.

Mechanical properties of metals; elastic limit and yield point; ductility; ultimate and elastic strength; form of fracture; measure of ductility; impact tests; hardness; effect of shape of test piece; effect of over strain; hardening and annealing; influence of rate of loading; effect of temperature.

Resilience; live loads; resistance to shock; fatigue; consideration of experimental results; limiting range of stress.

Factors of safety.

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Stresses in framed structures.

Riveted joints; strength of thin shells.

Bending; diagrams of bending moment and shearing force for fixed loads; relation between bending moment and shearing force; simple and other bending; moments of inertia of sections; beams of uniform strength; distribution of shear stress; pitch of rivets in girders; principal stresses in beams; bending beyond elastic limit; deflection of beams; curvature, slope and deflection; bending moment, slope and deflection diagrams. Strength and stiffness of springs and shafts in torsion. Flat carriage springs. Strength of columns; Euler's theory; Rankine and other formulæ.

R. 161.

III.—MATERIALS TESTING LABORATORY.

(College Certificate only.)

- (a) Tests on lime and cement.
- (b) Strength of mortars and concrete.
- (c) Tests on metals and timbers, and other Engineering Materials.

Note.—Each candidate must produce a certificate from the Principal of his College that he has completed in a satisfactory manner a practical course based on the above course and handed in a journal containing a full record of his laboratory work.

R. 162.

IV.—BUILDING CONSTRUCTION (One Paper.)

(100 Marks).

Initial survey of site; trial pits and borings; strata and their bearing capacities. Depth and breadth of foundations in reference to strata, and weight to be carried. Suitability of strata for bridge, dam, or weir foundations. Wet foundations and methods of dealing with them.

Piles-wood, iron, and concrete.

Pile driving, coffer dams, caissons, and wells. Black cotton soil foundations.

Reinforced concrete rafts; mass concrete foundations.

Under-pinning.

Building instruments and tools; shoring and strutting; scaffolding and centering; falsework.

Woodwork; joints and joinery; floors, and doors; windows and panelling; roof trusses, rafters, battens and stairs.

Classes of masonry and their uses; uncoursed rubble; coursed rubble; ashlar; block-in-course; bonding of stones; brick masonry and its bonding.

Arches-brick, stone, and concrete, right and skew and their construction.

Finishing—plastering and pointing.

Reinforced Concrete Construction: moulds and formwork; reinforcement and its placing; selection of materials, proportioning,

water cement ratio, mixing, laying and curing. Removal of forms and after treatment. Precast concrete block-work.

Floors. Murrum, concrete, brick stone. Reinforced concrete floors, reinforced brick floors. Uses and methods of construction. Ceilings; stairs.

Roofs; Flat, hipped and vaulted and trusses; roof coverings.

Structural plumbing and glazier's work.

R. 163.

V.—CIVIL. Engineering—(One Paper.) (100 Marks.)

Roads. Temporary and permanent roads. Telford and macadam roads. Hill roads. Ruling gradients. Earth work. Rubble and concrete foundations. Various types of road surfaces. Camber and super-elevation. Resistance of vehicles and wear of roads. Maintenance and repairs. Road Administration.

Railways. Earthwork. Tunnelling. Culverts and drainage. Permanent way and its equipment. Transition curves. Super-elevation on curves. Railway stations and their general layout. Rolling stock. Brakes. Signalling. Train resistance.

Bridges. Different types of road and railway bridges. Choice of material and type. Waterways. Foundations of piers. Abutments and wing walls. Standard live and wind loads for design. Movable bridges. Methods of erection.

Docks and Harbours. Layout of docks. Tidal basins. Dock walls of gravity section. Graving docks. Methods of construction. Dock and dock gates. Transit sheds and warehouses. Jetties and landing stages. Break-waters. Dredgers and dredging.

R. 164.

VI.—Surveying—(One Paper and Practical.)

Paper: 100 Marks. Practical: 50 Marks.

Surveying.—Advanced levelling: contours, grade contours; setting out a grade and side slopes; stadia and their use. Sources of error; precautions; accuracy required; correction for curvature and refraction. Dip of the horizon.

The theodolite; types of instrument; parts of the instrument and their uses. Handling and care of instruments; temporary and permanent adjustments.

Plane triangulation and traversing; Gale's traverse system.

Errors; degree of accuracy and checking work.

Laying out curves with and without theodolites; setting out work generally with the theodolite; determination of heights.

Use of planimeters; finding areas by various methods. Use of smaller instruments such as sextants, barometers, etc.

Practice in all the above.

Spherical Trigonometry—Relation between the trigonometric functions of the sides and angles of a spherical triangle. Polar

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triangle and its properties. Solution of right-angled triangles. Solution of oblique-angled triangles (the ambiguous case excepted). Area of a spherical triangle. Spherical excess.

Field Astronomy—Altitude; azimuth; right ascension; declination and hour angle. Sidereal time and mean time. Refraction; parallax; determination of latitude and longitude.

The Practical Examination will cover the work prescribed for F. E. as well as S. E. (Civil).

R. 165.

VII.—DRAWING AND DESIGN.

Drawings: 100 Marks.

Oral and Sketching: 50 Marks.

Each candidate shall submit a complete set of drawings certified by the Principal of his College that they have been prepared in a satisfactory manner within the walls of the College. Reports on the survey projects shall also be submitted. The drawings (not less than 4 sheets) shall consist of:—

- (a) Survey drawing (not less than two sheets).
- (b) At least one sheet of a simple design, in each of the following:—

(i) Building Construction and

(ii) Civil Engineering.

All the above sheets shall be finished in pencil and fully dimensioned, except one sheet from item (b) which shall be inked and coloured.

The fieldbooks and reports shall be submitted for (a) and (b) separately.

The drawings and reports shall be submitted to the Examiners and marks shall be awarded as follows:—

(1)	Neatness and draftsmanship	20
(2)	Accuracy	15
	Dimensioning	15
(3)		25
(4)	Details	25
(5)	Reports	
		100

The practical examination shall consist of :-

(a) An oral test with general questions on the elementary design, surveys and reports.

(b) Sketching.

Note:—No questions on the design of reinforced concrete will be asked as this forms part of the B. E. Syllabus.

Marks shall be awarded as follows:—
25 for the oral and 25 for sketching.

When once the drawings have been submitted for the examination and marked, that marking will be carried on to ubsequent examinations unless new drawings are presented. A

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candidate whose marks in Drawing are thus carried over shall be eligible for a class.

Part II

Note:—For passing, the candidate must obtain a minimum of 40 per cent. of the combined total of 150 marks.

R. 166.

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VIII.—Geology—(One Paper and Practical.)

Paper: 100 marks. Practical: 50 marks.

General Geology. Objects and methods. Divisions of the subject. The crust and the interior of the earth.

Geological agencies, subaerial and subterranean. Denudation and deposition. Wind, river, glacial and marine erosion. Volcanoes and earthquakes.

Formation of the stratified rocks, stratification and lamination. Dip, strike, outcrop and foldings of rocks and their significance. Overlap, outlier and inlier. Joints in rocks. Faults, their varieties and importance in the construction of dams, engineering structures, in mining and well sinking. Simple problems in structural geology. The Sources of water for domestic, municipal and industrial uses. Underground table land of water. Springs. Artesian water.

Mineralogy and Petrology. The common rock forming minerals. Quartz and its varieties. Silicates. Allumino-alkaline and ferromagnesium silicates. Ores of commercial importance.

Composition of the Earth's crust. Igneous, aqueous and metamorphic rocks. Their classification, composition and characters in hand specimens. Arrangement of igneous rocks in the earth's crust. Contemporaneous and intrusive rocks. Dykes. Agents of metamorphism. Extent of metamorphism. Foliation and cleavage. Ore deposits. Bedded deposits and metalliferous veins. Industrial aspects of rocks.

Stratigraphy and Indian Geology. The uses of fossils in historical geology. Other aids in correlation of rocks. Order of superposition. Chronological groups and cycles. The classification of the stratified rocks into systems and divisions.

The geological history of India in broad outline. The distribution of the stratified and igneous rocks in India. Occurrence of the important ores and minerals of India. Petroleum and coal.

Applied Geology. Geological maps. Field operations, Geological surveying. The formation of "Alkali" soils. Lakes. Factors governing watertightness. Erosion and structural valleys. Structural basis and troughs. Leakage from dykes, falts and veins. Influence of joints and fissures. Underground water from alluvial deposits, sedimentary strata, and igneous and metamorphic rocks. Tunnels and shafts. Alignment of tunnels, parallel and oblique to the strike of the strata. Effects of faults and earthquakes. Stability

Practical. Identifications of the common rock forming minerals, rocks and ores. The six systems of crystallography. Chemical and physical tests for minerals and rocks.

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Geological maps and sections.

Note—Each candidate must produce a certificate from the Principal of his College that he has completed in a satisfactory manner a practical course based on the above examination course and handed in a journal containing a full record of his year's work.

Standard for Passing the Examination.

- R. 167. To pass the examination the candidate must obtain 40 per cent. of the full marks in each subject and 45 per cent, of the total marks obtainable. The minimum of 40 per cent, for a pass must be obtained separately in the written and practical examination in each subject. Those of the successful candidates who obtain 60 per cent. of the total marks obtainable will be placed in the First Class. In Drawings, candidates must obtain 40 per cent. of the full marks in the practical sketching and oral examinations taken together.
- R. 168. A candidate who has obtained 50 per cent. of the total marks in any subject will at his option, be excused from appearing in that subject (provided he has obtained the minima in the paper and in the practical of that subject required by Regulation 167) at a subsequent examination and will be declared to have passed the whole examination when he has passed in all the subjects of the examination: Provided that in the subject or subjects in which he appears on the last occasion he must obtain the minimum in each paper, subject or practical together with the percentage of the total marks in that subject or subjects required by Regulation 167. Candidates passing the examination in this manner in compartments will not eligible for a class or for any prize or scholarship to be awarded at the examination.
- R. 169. Candidates who fall short of the minimum required to pass under one head by not more than three per cent. and who obtain an aggregate of at least 55 per cent. of the total marks obtainable shall, on the recommendation of a majority of not less than two-thirds of the Examiners present at the final meeting, be declared to have passed the examination.

(23).—EXAMINATION FOR THE DEGREE OF BACHELOR OF ENGINEERING (CIVIL).

Admission.

- No candidate will be admitted to the examination unless he shall have kept two terms in a College recognized in Civil Engineering by the University of Bombay subsequently to passing the Second Examination in Engineering (Civil).
- A student who has passed in all subjects but one at the S. E. (Civil) Examination in conformity with Regulation 168 will be allowed to keep terms, and to appear for the B. E. (Civil) Examination after keeping two terms, but will not be declared to have passed the B. E. Examination under any circumstances, unless he has passed in the remaining subject of the S. E. (Civil) Examination held either in a previous, or in the same examination season.

R. 170. Candidates will be examined in the following subjects excepting, however, Estimating, which shall be a certificate subject as stated below. Details of the courses in each subject will be specified from time to time by the Academic Council on the recommendation of the Board of Studies.

I.—Theory of Structures. (One paper of 100 marks.)

II.—Reinforced Concrete and Structural Design. (One paper of 150 marks.)

III.—Civil Engineering, Paper I. (One paper of 100 marks.)

IV.—Civil Engineering, Paper II. (One paper of 100 marks.)
 V.—Elements of Engineering Economics. (One paper of 100 marks.)

VI.—Technical Essay and Prècis. (One paper of 100 marks.)

VII.—Estimating. (College Certificate only.)

VIII.—Drawing and Design.

(Section A. Drawings 60 marks;

Sketching and Oral 40 marks.

Section B. Drawings 60 marks;

Sketching and Oral 40 marks.)

R. 171. On the recommendation of the Board of Studies, the Academic Council may, from time to time, prescribe or recommend text-books in the various subjects of this examination and modify from time to time, as may be found necessary, the details of the theoretical and practical courses laid down for this examination.

Syllabus.

R. 172.

I.—Theory of Structures. (One paper.) (100 Marks.)

Revision of Second year work.

Fixed beams, continuous beams, resilience of beams.

Columns—Euler's, Rankine's, Parabolic and Straight line formulæ.

Rolling Roads— Influence lines. Combined dead and live load diagrams for shear force and bending moment.

Plate girders; dead and live load stresses in framed trusses for bridges; timber and metal roofs.

Deflection of framed structures.

Direct and bending stresses; water pressure; earth pressure; Rankine's and wedge theories; designs of dams and retaining walls.

Depth of foundations; grillage and pile foundations.

Hanging chains, suspension bridges; three-hinged and other metal arches. Masonry arches.

R. 173. II.—Reinforced Concrete and Structural Design. (One Paper.)
150 Marks. (Four Hours).

REINFORCED CONCRETE AND STRUCTURAL DESIGN:

Section I. (50 Marks.)

Fundamental assumptions. Theory of simple bending as applied to rectangular beams. Moment of Resistance. Relation between

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the amount of reinforcement and the position of the Neutral Axis and the stresses induced. Economic percentage of reinforcement. Bond stress. Shear stress. The design of slabs. "T" beams. Rectangular beams. Design of shear reinforcement, bent bars and stirrups. Doubly reinforced beams. Columns and footings. Rectangular and circular water-tanks. Retaining walls: cantilever and counter-fort types.

Section II.

(100 Marks.)

Simple designs in Reinforced Concrete and Structural Steel. Alternative questions must be set, both in concrete and in steel.

R. 174. III.—Civil Engineering, Paper I. (One Paper.)

100 Marks.

Hydraulics. Bernoulli's Theorem. Pressure and velocity of water.

Discharge from small orifices. Discharge from pipes, long and short. Discharge from large orifices under constant and varying heads; notches, syphons, partially submerged discharge. Discharge from weirs, free overfall and submerged.

Fluid friction laws, co-efficients, H. M. R., hydraulic slopes, velocities in pipes, short and long. Flow in open channels. Formulæ and co-efficients. Influence of form on velocity. Variations of velocity in vertical and horizontal sections. Gauging. Instruments

Irrigation. Importance and nomenclature. Irrigation from wells and storage reservoirs. Inundation and perennial irrigation.

Conditions of irrigation in India and abroad. Catchment areas. Rainfall and run-off. Supplies available. Storage tanks. Dams—types, sites, foundations, profile, materials and methods of construction.

Sluices in dams, waste weirs, pick-up weirs.

Canal head works, weirs and under sluices.

Canal alignment, command, gradients, velocities, silting, non-silting and scouring sections. Falls and escapes. Function, design and location. Cross-drainage works, aqueducts, culverts, level crossings, super-passages, syphons, including calculation of waterway.

Distributaries, their design, alignment, distributary heads and controlling apparatus.

Water courses and outless, modules, semi-modules and ratable modules. Standing waves. Regulation and rotations. Discharge observations. Duty. "Delta" Assessment.

Note.—Each candidate must produce a certificate from the Principal of his College that he has completed in a satisfactory manner a practical course based on the above examination course and handed in a journal containg a full record of his laboratory work.

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[Part II

R. 175.

IV.—CIVIL ENGINEERING Paper II. (One Paper.)

100 Marks.

Water Supply. Historical summary. Sources of supply and quality of water. Quantity per head. Storage reservoirs. Open and covered conduits. Pollution, filtration and sterilization. Pumps and pumping. Pipe lines, service reservoirs, relieving reservoirs, pressure and volumes required for ordinary and fire services. Distribution systems, valves, hydraulic fittings, meters and waste prevention.

Sanitary Engineering. The atmosphere, ventilation, warming, cooling. Air conditioning. Cubic contents of rooms for various purposes. Sewage contents and composition. Garbage. Drains and sewers, construction, size, gradients and flow, defects and testing for defects. Sewage lifts, ejectors and pumps. House connections, traps, junctions, ventilators, vents and man-holes. House utensils, sinks. closets, urinals. Lavatories, connecting, cleansing and disinfection. Sewage and refuse disposal, methods and details. Temporary camps.

R. 176.

V.—Elements of Engineering Economics. (One Paper).

100 Marks.

Economics. Nature and importance of wealth. Supply and demand. The law of substitution and standard of living. Agents in production. Labour and capitalistic production. Joint stock companies. Monopolies Trusts. Markets. Stock Exchange. Business organization, advertising, insurance, stores, costs and costing, depreciation and valuation. Money and credit. Currency exchange. Paper currency. Coinage. Gresham's Law. national trade. Foreign exchange. Banks and their functions. Credit facilities. Labour and wages, methods of paying wages, bonus and profit sharing systems. Trade Unions. Strikes and lockouts.

Book-keeping. The Journal, Cash Book, Purchases Book, Sales Book. The Ledger. Double entry. Balancing, trial balance, balance sheet. Bad debts. The trading and profit and loss accounts.

Specifications. Specifications for inviting tenders. Information to be given on preliminary enquiry, and on placing the orders, contracts for supply, erection, guarantees and acceptance. Standard forms of contracts.

Law. Industrial legislation. Workmen's Compensation Act. Prevention and settlement of disputes. Unemployment Insurance.

R. 177.

VI.—TECHNICAL ESSAY AND PRÉCIS (One paper.)

100 Marks.

The paper shall consist of (a) a technical essay on one of no less than three given subjects connected with Civil Engineering carrying 60 marks, and (b) a question in précis writing carrying

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R. 178.

VII.—ESTIMATING.

(College Certificate only.)

Estimating quantities and the costs of buildings and other structures of timber, masonry, reinforced concrete, earth work and steel. Specifications. Costing of work.

Note.—Each candidate must produce a certificate from the Principal of his College that he has attended a course of lectures on Estimating and satisfactorily completed the exercises set therein.

R. 178A.

- VIII .- (a) Drawing and Design (Civil Engineering Project).
 - (b) " " " (Reinforced Concrete & Structural Design.)

Drawings 120 Marks. Sketching and Oral ... 80 Marks. Total 200 Marks.

Each candidate shall submit a complete set of detailed working drawings certified by the Principal of his College that they have been prepared in a satisfactory manner within the walls of the College. Reports on the Projects and Designs shall also be submitted.

The Drawings shall consist of :-

- (a) A Civil Engineering Project in not less than two sheets.
- (b) A Design of a steel or reinforced concrete structure in not less than two sheets.

All the above sheets shall be finished in peneil and fully dimensioned, except one sheet in each of the items (a) and (b) which shall be inked and coloured.

The Drawings and reports shall be submitted to the Examiners, and marks shall be awarded as follows:—

60 marks for (a) and 60 marks for (b) distributed as under:-

(1)	Neatness and d	raftsi	manship		•••	12
(2)	Accuracy				•••	12
(3)	Dimensioning		•••		•••	6
(4)	Details		•••		•••	12
(5)	Report	•••	•••	•••	•••	18
		. ,				60

The practical examination shall consist of :-

- (a) An oral test with general questions on the Project and on the Design.
- (b) Sketching.

Marks shall be awarded as follows :-

Marks	for	Project	(Oral & Sketching)	•••	•••	40
Marks	for	Design	do.		•••	40

When once the drawings have been submitted for the examination and marked, that marking will be carried on to subsequent examinations unless new drawings are presented. A candidate whose marks in Drawing are thus carried over shall be eligible for a class.

[Part II

Note.—For passing, the candidate must obtain a minimum of 40 per cent. of the combined total of 200 marks.

Standard for Passing the Examination.

- R. 179. To pass the examination the candidate must obtain 40 per cent. of the full marks separately in the written, practical or oral examination in each subject, and 45 per cent. of the total marks obtainable. Those of the successful candidates who obtain 66 per cent. of the total marks obtainable will be placed in the First Class. In Drawings candidates must obtain 40 per cent. of the full marks in the practical, sketching and oral examinations taken together.
- R. 180. A candidate who has obtained 50 per cent. of the full marks in any subject will, at his option, be excused from appearing in that subject (provided he has obtained the minimum in the paper and the practical of that subject required by Regulation 179) at a subsequent examination and will be declared to have passed the whole examination when he has passed in all the subjects of the examination: Provided that in the subject or subjects in which he appears on the last occasion he must obtain the minimum in each paper, subject or practical, together with the percentage of the total marks in such subject or subjects required by Regulation 179. Candidates passing the examination in this manner in compartments will not be eligible for a class or for any prize or scholarship to be awarded at the examination.
- R. 181. Candidates who fall short of the minimum required to pass under one head by not more than three per cent. and who obtain an aggregate of at least 55 per cent. of the total marks obtainable shall, on the recommendation of a majority of not less than two-thirds of the Examiners present at the final meeting, be declared to have passed the examination.

TRANSITORY REGULATIONS.

The S. E. (Civil) Examination according to the old regulations will be held for the last time in 1939 and candidates may also appear in Geology as prescribed for the S. E. (Civil) Examination under the new regulations.

Candidates who pass the S. E. (Civil) Examination according to the old regulations will be required to take the B. E. (Civil) Examination according to the new regulations and in addition the subject of Geology as prescribed for the S. E. (Civil) Examinations under the new Regulations which may be taken either at the S. E. (Civil) Examination or the B. E. (Civil) Examination. The marks obtained in Geology shall not be counted for the purpose of a class.

Candidates who pass the B. E. (Civil) Examination according to the revised regulations but fail in the subject of Geology shall be eligible for a class according to the results of their performance at the B. E. (Civil) Examination on their subsequently passing in the subject of Geology.

(24).—SECOND EXAMINATION IN ENGINEERING (MECHANICAL AND ELECTRICAL).

Admission.

- No candidate will be admitted to this examination unless he produces satisfactory testimonials of having kept two terms in a College recognized in Mechanical and Electrical Engineering by the University of Bombay subsequently to passing the First Examination in Engineering.
- A student who has passed in all subjects but one at the F. E. Examination in conformity with Regulation 155 will be allowed to keep terms and to appear for the S. E. (Mechanical and Electrical) Examination after keeping two terms, but will not be declared to have passed the S. E. (Mechanical and Electrical) Examination under any circumstances, unless he has passed in the remaining subject of the F. E. Examination held either in a previous or in the same examination season.
- *R. 182. Candidates will be examined in the following subjects. Details of the courses in each subject will be specified from time to time by the Academic Council on the recommendation of the Board of Studies.
 - I. Strength of Materials. (One paper of 100 marks.)
 - II. Calculus. (One paper of 100 marks.)
 - III. Prime Movers. (One paper of 100 marks and a practical examination of 50 marks.)
 - IV. Electrical Engineering. (Two papers of 100 marks each.)
 - V. Drawing. (Practical 100 marks; Sketching and Oral 50 marks.)
 - VI. Workshop Practice. (A practical examination of 100 marks.)
 - VII. Elements of Engineering Economics. (One paper of 100 marks.)
 - R. 183. On the recommendation of the Board of Studies, the Academic Council may, from time to time, prescribe or recommend text-books in the various subjects of this examination and modify from time to time, as may be found necessary, the details of the theoretical and practical courses laid down for this examination.

Syllabus.

- R. 184. I.—Strength of Materials.—(One paper.)
 - As at the Second Examination in Engineering (Civil).
- R. 185. II.—CALCULUS.—(One paper.)

 As at the Second Examination in Engineering (Civil).
- R. 186. III.—Prime Movers.—(One paper and practical.)
 (Paper 100 Marks: Practical 50 Marks.)

Laws of permanent gases; rate of heat reception; entropy.

^{*}A candidate who appeared at the S. E. Mechanical and Electrical Examination under the old Regulations when 'Elements of Engineering Economics' was not one of the prescribed subjects and failed to pass the examination will, when appearing on a subsequent occasion, be exempted from the said subject.

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Hot air engines, cycles of operation. Carnot's cycle, conditions for maximum efficiency.

External work by steam. Internal energy. Superheated steam. Throttling or wire-drawing. Measurement of dryness of steam. Theory of throttling calorimeter.

Theory of steam engines. Effect of initial pressure, ratio of expansion, and back pressure. Difference between hypothetical and indicator diagram. Simple and compound expansions.

Gas and oil engines. Constant pressure and constant volume cycles. Effects of compression. Otto and Clerk's cycles; indicator diagrams.

Theory of air compressors and motors, boilers and furnaces.

Valve diagrams and valve gears, various types.

Single cylinder steam engines and compound engines. Condensers, jet and surface; air pumps, feed pumps, steam turbines; marine engines: The operation and care of road rollers and portable engines.

Laboratory.—Simple tests on steam, oil and gas engines, boilers, pumps and turbines.

Testing of fuels.—Coal, oil, wood, and gas.

[Note.—Each candidate must produce a certificate from the Principal of his College that he has completed in a satisfactory manner a practical course based on the above examination course and handed in a note-book containing a full record of his laboratory work. The note-book shall be submitted to the Examiners and may be taken into consideration in awarding marks.]

Each candidate will be examined practically on the work performed in the laboratory.

R. 187.

IV.—ELECTRICAL ENGINEERING.—(Two papers). Paper I (100 marks).

Direct Current Machines—Principles of the electric generator and electric motor. Armature windings. Commutation and armature reaction. Brush sparking remedies. Series, shunt, and compound generators and motors. Characteristic curves. Starters and regulators. Methods of reversing. Common troubles and their cures. Standard ratings of D. C. motors. Connecting up of D. C. machines.

Alternating Currents—Elementary Theory—Elementary notions and definitions relating to an alternating quantity. Resistance, inductance and capacitance—series and parallel combinations. Angles of lag and lead. Power factor.

Synchronous Generators and Motors—Elementary theory of the generation of single, two and three phase currents. Descriptions of generators—engine, steam—turbine and water—wheel driven. Synchronous motors—characteristics and applications. Connecting up of generators and motors.

Induction Motors—General theory and descriptions of different types. Comparison between them in regard to starting and pull-out torques. Efficiency and power factor. Starting and protecting devices. Common troubles and their remedies. Effects of variations of voltage and frequency. Connecting up of induction motors.

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Transformers—Principles. Construction of single and three phase transformers and auto-transformers. Losses and efficiency. Reactance and regulation. Methods of cooling. Rating of transformers. Effects of variation in supply voltage and frequency. Connecting up of transformers.

Lightning Conductors and Arresters—Descriptions and working principles.

Paper II. (100 marks.)

Interior and Street Lighting—Descriptions of interior wiring systems. Suitability for different conditions. Calculation of wire size for voltage drop and current. Tree system and Distribution Board system. Insulation resistance. Reference to the I. E. Act and Fire Insurance Companies rules. Principles of street lighting.

Transmission and Distribution—Descriptions of overhead lines and underground cables for different voltages. Permissible current, voltage drop and loss. Capacitance.

Low Tension—Direct current two and three wire distribution; A. C. single and three phase distribution. Feeder and distribution pillars and disconnecting boxes. Consumer services. Cutouts. Costs.

Converting Apparatus—A. C. to D. C. and Vice Versa—Description and working principles of motor generators, rotary converters, motor converters and mercury arc rectifiers. Discussion of their respective advantages and disadvantages under different circumstances.

Other Applications of Electricity—Telegraph, telephone, bells and alarms. Electric welding in construction and repairs.

Practical Work.

Measurement of low, medium and high resistance, including insulation resistance; study of parts and characteristics of separately—excited, shunt, series and compound generators and motors. Effect of variation of speed and field-strength on generated voltage. Effect of variation of applied voltage and excitation on speed of motor. Brake and efficiency tests of motors. Determination of losses, calibration of measuring instruments. Study of secondary cells.

Testing of lightning Conductors.

Note.—Each candidate must produce a certificate from the Principal of his College that he has completed in a satisfactory manner a practical course on the lines laid down from time to time by the Syndicate, and handed in a note-book containing a full record of his laboratory work and visits to works using mechanical and electrical power.

R. 188. V.—Drawing.

(Practical 100 Marks; Sketching and Oral 50 Marks.)

Each candidate shall submit a complete set of uncoloured detailed working drawings certified by the Principal of his College that they have been prepared in a satisfactory manner within the walls of the College, reports and estimates.

The drawings shall consist of :-

(a) Machine details from sketches and valve diagrams, and

(b) Complete working drawings, from sketches, estimates of weights and machining areas, tracings and ferrotypes.

The drawings, reports and estimates shall be submitted to the Examiners and marks shall be awarded as follows:—

40 per cent. for draftsmanship, hand-printing, and dimensioning; 40 per cent. for detail; and 20 per cent. for the reports and estimates.

The Practical Examination shall consist of :-

- (a) An oral test with general questions on the drawings, reports and estimates.
- (b) Sketching.

Marks shall be awarded as follows :-

25 for the oral, and 25 for sketching.

When once a set of Drawings has been submitted for the examination and marked, that marking will be carried on to subsequent examinations unless new Drawings are presented. A candidate whose marks in Drawing are thus carried over shall be eligible for a class.

R. 189.

VI.—Workshop Practice.—(Practical Examination.) (100 Marks.)

Joining of plates by means of rivets, welding, brazing, and soldering; pattern making and moulding; exercises incorporating fitting and the use of machine tools.

[Note:—Every candidate must produce a certificate from the Principal of his College that he has satisfactorily completed the course.]

R. 189A.

VII.—ELEMENTS OF ENGINEERING ECONOMICS.—(One paper.) As at the B. E. (Civil) Examination (*Vide* Reg. 176).

R. 190.

The regulations regarding the standard for pass, class and exemption are the same as those for the Second Civil Engineering Examination.

(25).—EXAMINATION FOR THE DEGREE OF BACHELOR OF ENGINEERING (MECHANICAL).

Admission.

- 0. 244.
- No candidate will be admitted to the examination unless he shall have kept two terms in a College recognized in Mechanical Engineering by the University of Bombay subsequently to passing the Second Examination in Engineering (Mechanical and Electrical).
- A student who has obtained exemption from all subjects but one at the S. E. (Mechanical and Electrical) Examination will be allowed to keep terms and to appear for the B. E. (Mechanical) Examination after keeping two terms, but will not be declared to have passed the B. E. (Mechanical) Examination under any circumstances unless he has passed in the remaining subject of the S. E. (Mechanical and

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Electrical) Examination held either in a previous, or in the same examination season.

*R. 191.

Candidates will be examined in the following subjects. Details of the courses in each subject will be specified from time to time by the Academic Council on the recommendation of the Board of Studies.

I.—Strength of Materials. (One paper of 100 marks.) II.—Prime Movers. (Two papers of 100 marks each.)

III.—Hydraulics and Hydraulic Machinery. (One paper of 100 marks.)

IV.—Electrical Engineering. (One paper of 100 marks.)

V.—Drawing. (Practical 100 marks; Sketching and Oral 50 marks.)

VI.—Workshop Appliances and Practice. (One paper of 50 marks and a practical examination of 100 marks.)

VII.—Technical Essay and Precis. (One paper of 100 marks.)

R. 192.

On the recommendation of the Board of Studies, the Academic Council may, from time to time, prescribe or recommend text-books in the various subjects of this examination and modify from time to time, as may be found necessary, the details of the theoretical and practical courses laid down for this examination.

Syllabus.

R. 193.

I.—STRENGTH OF MATERIALS.—(One Paper.)

100 marks.

Revision of Second Year's work.—Combined stresses. Crank shafts. Vibrations, free and forced. Critical speeds. Stresses in thick cylinders. Stresses in revolving discs. Strength of boiler flues.

R. 194.

II.—PRIME Movers.—(Two Papers.)

Part A .- 100 Marks.

Entropy steam. Calculation of dryness fraction after expansion. Mollier diagrams. Total heat. Pressure diagram.

Theory of the steam engine: Work done during the expansion of steam. Perfect steam engine working on Carnot's cycle. Non-expansion engine. Rankine cycle. Temperature-entropy diagram for Rankine cycle. Effect of using superheated steam. The regenera tive steam engine. Methods of drawing temperature entropy diagrams for pressure volume diagrams. Valve leakage. Steam jacket. Diagram factors. Steam consumption. Combination of diagrams. Binary vapour engine.

Balancing engines:—Primary balancing and secondary balancing.

Part B .- 100 Marks.

Mechanical refrigeration. Types of mechanical refrigeration machines.

^{*}A candidate who appeared at the B. E. Mechanical Examination under the old Regulations when 'English' (Technical Essay and Precis) was not one of the prescribed subjects and failed to pass the examination will when appearing on a subsequent occasion be exempted from the said subject.

Flow of steam through orifices and nozzles. Theory of the steam turbine. Heat transmission. Theory of internal combustion in gas oil and petrol engines.

Laboratory work and tests.—Scientific and commercial tests of steam and internal combustion engines and boilers, steam turbines,

pumps and water turbines.

Note.—Each candidate must produce a certificate from the Principal of his College that he has completed in a satisfactory manner a practical course on the lines laid down from time to time by the Academic Council on the recommendation of the Board of Studies and handed in a note-book containing a full record of his laboratory work. The note-book shall be submitted to the Examiners and shall be taken into consideration in awarding marks.

No candidate shall be declared to have passed in the subject of Prime Movers unless he has obtained at least 40 per cent. of the full marks in Part A and Part B separately.

R. 195.

III.—Hydraulics and Hydraulic Machinery.—(One paper). (100 Marks.)

Hydraulics—As at the Examination for the Degree of Bachelor of Engineering (Civil).

Hydraulic Machinery.—General principles of use of hydraulic power.

Description of types of turbines, impulse and reaction. Pelton wheel. Determination of vane angles and wheel diameters. Efficiencies. Governing of turbines.

Hydraulic packings, rams, cranes, lifts, presses, accumulators and intensifiers.

Pumps.—Reciprocating. Separation. Air vessels. Pump valves. Centrifugal and turbine pumps. Action of efficiencies. Vortex chamber. Guide vanes. Determination of leading dimensions.

Note.—Each candidate must produce a certificate from the Principal of his College that he has completed in a satisfactory manner a practical course based on the above examination course and handed in a note-book containing a full record of laboratory work. The note-book shall be submitted to the Examiners and shall be taken into consideration in awarding marks.

R. 196.

IV.—ELECTRICAL ENGINEERING. (1 paper of 100 marks.)

Characteristics of Good Lighting-

Lamps—standard sizes, lumen outputs, polar curves, life; variation of light and life with voltage.

Fittings—reflecting, refracting and diffusing, indirect, semi-indirect and totally enclosed. Polar curves of lamps in fittings. Reflecting factors of walls and ceilings. Intensities required for various purposes. Depreciation factor. Number and wattage of lamps Co-efficient of utilization.

Flood lighting.

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Domestic Electrical Appliances.

Water heaters, cookers, refrigerators, etc.

Measuring Instruments-

D. C. and single phase A. C. meters and methods of connecting them up.

Instruments for A. C. Dynamometer and induction type wattmeters, their errors and compensative devices. Supply meters. Instrument transformers and their errors. Phase meters. Frequency meters. Testing and adjustment of supply meters. Permissible errors. Standards and sub-standards for testing.

Commercial footcandle meters.

Operation and Testing-

Parallel operation of D. C. and A. C. generators and transformers. Synchroscopes and other synchronizing methods. Commercial testing of electrical machinery. Separation of losses.

High Tension-

Systems of transmission and distribution. Principles of protective systems and appliances. High tension testing.

Practical Work.

Variation of impedance with resistance, frequency or self induction and capacitance. Measurement of power and power factor. Determination of power lost in a choking coil and of power saved by its use. Effect of a condenser on phase relations and current in a circuit. Testing transformers for regulation and for iron and copper losses. Determination of characteristics of an alternator and of a synchronous motor. Operation of a rotary converter, from either side. Efficiency of induction motors.

Note.—Each candidate must produce a certificate from the Principal of his College that he has attended a course of lectures in, and has a satisfactory knowledge of the above subject; and that he has handed in a note-book containing an approved record of his work in the laboratory and visits to electrically driven works and factories, and licensed electrical undertakings.

R. 197.

V.—DRAWING.

(Practical 100 Marks; Oral and Sketching 50 Marks.)

Each candidate shall submit a complete set of detailed working drawings certified by the Principal of his College that they have been prepared in a satisfactory manner within the walls of the College and the reports.

The drawing shall consist of not less than four complete sheets of detailed working drawings in pencil of simple machinery, and calculations in the form of reports.

The drawings and reports shall be submitted to the Examiners and marks shall be awarded as follows:—

40 per cent. for draftsmanship, hand-printing, and dimensioning.

40 per cent. for details, and 20 per cent. for the reports.

The practical examination shall consist of :-

(a) An oral test with general questions on the designs and the reports.

(b) Sketching.

Marks shall be awarded as follows:— 25 for the oral, 25 for sketching.

When once a set of Drawings has been submitted for the examination and marked, that marking will be carried on to subsequent examinations unless new Drawings are presented. A candidate whose marks in Drawing are thus carried over shall be eligible for a class.

R. 198.

VI.-WORKSHOP APPLIANCES AND PRACTICE.

(One Paper and Practical.)

(Paper 50 Marks; Practical 100 Marks.)

(a) Workshop Appliances.—Materials used in the construction of machines. Hand tools for metal and wood. Shaping, drilling, planing, slotting, punching, and shearing machines.

Distribution of motive power by gearing, belt, friction, textile rope, wire-rope and toothed wheels.

Bearings, journals, hangers, cranes and crane chains.

Erection of plants, foundation, levelling, piping.

(b) Workshop practice.—Pattern making, foundry and smithy, preparation and tempering of cutting tools.

Practice on lathes, planing, slotting and milling machines. Gear and screw cutting. Steam, gas, and oil engines and boiler tending.

R. 198A.

VII.—TECHNICAL ESSAY AND PRECIS.

(One paper of 100 marks.)

The paper shall consist of (a) a technical essay on one of not less than three given subjects connected with Mechanical Engineering, carrying 60 marks and (b) a question in precis writing, carrying 40 marks.

R. 199.

The regulations regarding the standard for pass, class and exemption as also those for the publication of the results etc., are the same as those for the B. E. (Civil) Examination.

(26).—EXAMINATION FOR THE DEGREE OF BACHELOR OF ENGINEERING (ELECTRICAL).

Admission.

0. 245A.

No candidate will be admitted to the examination unless he shall have kept two terms in a College recognised in Electrical Engineering by the University of Bombay subsequently to passing (a) the Second Examination in Engineering (Mechanical and Electrical), or (b) the Bachelor of Engineering (Mechanical) (old course).

0. 245B.

A student who has obtained exemption from all subjects but one at the S. E. (Mechanical and Electrical) Examination will be allowed

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to keep terms and to appear for the B. E. (Electrical) Examination after keeping two terms, but will not be declared to have passed the B. E. (Electrical) Examination under any circumstances, unless he has passed in the remaining subject of the S. E. (Mechanical and Electrical) Examination held either in a previous or in the same examination season.

R. 199A.

- (i) Candidates who have passed the Second Examination in Engineering (Mechanical and Electrical) will be examined in the following subjects. Details of the courses in each subject will be specified from time to time by the Academic Council on the recommendation of the Board of Studies:
 - I.—STRENGTH OF MATERIALS. (One paper of 100 marks).
 - II.—PRIME Movers. (One paper of 100 marks).
 - III.—HYDRAULICS AND HYDRAULIC MACHINERY. (One paper of 100 marks).
 - IV.—TECHNICAL ESSAY AND PRECIS. (One paper of 100 marks).
 - V.—ELECTRICAL INSTALLATIONS AND POWER SUPPLY. (One paper of 100 marks).
 - VI.—TRACTION AND RADIO-COMMUNICATION. (One paper of 100 marks).
 - VII.—ELECTRICAL ENGINEERING. (One paper of 100 marks and a practical examination of 100 marks).
 - VIII.—Drawing & Design. (Practical 100 marks; Sketching and oral 50 marks).
- (ii) Candidates who have passed the B. E. (Mechanical) (old course) will be examined in the following subjects:—

S. E. (Mechanical and Electrical).

IV.—Electrical Engineering (2 papers).

VII.—Engineering Economics.

B. E. (Electrical).

IV .- Traction and Radio Communication.

V.—Electrical Engineering.

VI.—Installations and Power Supply.

VII.—English.

VIII.—Drawing and Design.

IX.—Estimating (College Certificate only.)

A candidate who has passed in the subject of Prime Movers at the B. E. (Mech.) Examination shall, at his option, be exempted from the Paper in Prime Movers at the B. E. (Elec.) Examination, provided that he has obtained at least 40 per cent. of the full marks in the paper pertaining to Part B of the subject of Prime Movers at the B. E. (Mech.) Examination.

R. 199B.

On the recommendation of the Board of Studies the Academic Council may, from time to time, prescribe or recommend text-books in the various subjects of this examination and modify from time to time, as may be found necessary, the details of the theoretical and practical courses laid down for this examination.

EXAMINATIONS

Syllabus.

R. 199C.

I.—Strengeh of Materials. (One paper of 100 marks.)
As at the B. E. (Mechanical) Examination.

R. 199D. II.—PRIME MOVERS. (One paper of 100 marks). As part B at the B. E. (Mechanical) Examination.

R. 199E. III.—HYDRAULICS AND HYDRAULIC MACHINERY. (One paper 100 marks). As at the B. E. (Mechanical) examination.

IV .- TECHNICAL ESSAY AND PRECIS.

(One paper 100 marks.)

R. 199F. The examination shall consist of (a) a technical essay on one of not less than three given engineering subjects dealing with the Electrical branch of the profession, carrying 60 marks and (b) a question in precis writing, carrying 40 marks.

R. 1996. V.—ELECTRICAL INSTALLATIONS AND POWER SUPPLY.

(One paper of 100 marks.)

Power Supply.

Load curves. Fixing number and size of generating and transforming units. Fixing voltages of transmission and generation. Short-circuit valves and the selection of switchgear. Application of reactances. Control boards and instruments. Exciter and auxiliary devices. Earthing. Protective scheme. Lightning protection.

Power Transmission.

Transmission lines, electrical calculations, general features of design. Corona. Line insulators. Disturbances. Connections and switchgear. Stresses in poles, steel towers and conductors. Guys and anchors, E. H. T. pillars.

Power Installations.

Phase advancers. A. C. commutator motors. Choice of type of motor for different duties. Typical industrial installations. Control and protective gear.

Electrical equipment of power plants. Steam-electric, internal combustion-electric and hydro-electric installations.

R. 199H.

VI.—TRACTION AND RADIO-COMMUNICATION.

(One paper of 100 Marks.)

Traction.

Tramways—trolley and railless systems: bonded and welded rail joints; overhead and conduit equipment: motors and gearing; controllers.

Railways—overhead and third rail systems; use of direct and alternating currents; electric locomotives; multiple unit systems. Train resistance and acceleration; Types of motors used, their

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characteristics and motor control. Speed-time curves. Energy and power consumption. Braking and regenerative braking. Power distribution. Day-light light-signals. Power-operated switches and signals.

Train lighting. Electrolysis.

Electric propulsion-vehicles, boats and ships.

Radio-Communication.

Production and propagation of wireless waves.

Resonance and tuning; damping; coupled circuits.

Aerials. Directional wireless.

Thermionic valves and their characteristics.

Rectification and amplification.

Spark and valve transmitters.

Crystal and valve receivers, heterodyne reception.

Modulation, transmission and reproduction of speech.

R. 1991.

VII.—ELECTRICAL ENGINEERING.

(One paper of 100 marks and a practical examination of 100 marks.)

The syllabus for the written part as at the B. E. (Mech.) Examination.

(Oral and Practical.....100 marks).

The Oral and Practical Examination shall be of 3 hours' duration per candidate on the practical work done by the student as recorded in his laboratory note-book as required for the B. E. (Mech.) Examination and on the following in addition:—

Separation of iron losses of a transformer. Running generators in parallel. Determination of capacitance and inductance. High-tension testing.

Note:—Each candidate must produce a certificate from the Principal of his College that he has attended a course of lectures in, and has a satisfactory knowledge of the above subject; that he has handed in a note-book containing an approved record of his work in the laboratory, and visits to electrically driven works and factories and licensed electrical undertakings, and that he has done simple wiring, jointing and insulating, testing for faults in machines and circuits and tending of switchboards and batteries.

R. 199J.

VIII .- DRAWING.

(Practical 100 marks; oral and sketching 50 marks.)

Each candidate shall submit a complete set of designs with detailed working drawings certified by the principal of his College that they have been prepared in a satisfactory manner within the walls of the College and reports on the designs. These shall consist

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of complete designs with detailed working drawings of the following:—

(a) Design of the electric motor or generator, or any other

electric machine, and

(b) Design of a scheme for electric power supply and distribution together with complete specifications and an outline of the financial aspects of the project.

The designs and drawings shall be submitted to the Examiners and marks shall be awarded as follows:—

35 for draftsmanship, hand-printing and dimensioning.

30 for details, and

35 for reports on the designs.

The oral examination shall consist of :-

- (a) An oral test with general questions on the designs and reports.
- (b) Sketching.

Marks shall be awarded as follows:-

25 for the oral and 25 for sketching.

When once a set of Drawings has been submitted for the examination and marked, that marking will be carried on to subsequent examinations unless new Drawings are presented. A candidate whose marks in Drawing are thus carried over shall be eligible for a class.

R. 199 K. & R. 199 L. have been deleted.

R. 199M. The regulations for the standards for pass, class and exemption as also those for the publication of the results, etc., are the same as those for the B. E. (Civil) Examination.

R. 199N.

Notwithstanding anything contained in Ordinance 145, a candidate who has passed the B. E. (Mechanical) Examination according to the old course and who appears for the B. E. (Electrical) Examination in accordance with regulation 199 A, shall be eligible for classes in the same way as candidates appearing and passing in all the subjects of the B. E. (Electrical) Examination as laid down in the said Regulation 199 A.

(27.)—MASTER OF ENGINEERING (CIVIL, MECHANICAL OR ELECTRICAL).

Admission.

- O. 246.

 Each candidate must have passed the examination for the Degree of Bachelor of Enginering of the University of Bombay, or a corresponding examination of another University recognized as equivalent thereto, and must have practised as a Civil, Mechanical or Electrical Engineer, for at least three years after so passed.
- On a new application being submitted and a fresh fee paid, a candidate who has already passed the examination in one branch may

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M. E. A : ADMISSION

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appear on the same conditions on a subsequent occasion in a different branch.

R. 200.

The degree may be obtained in two ways:-

- (a) Candidate may submit with due authentication a full report of such Civil, Mechanical or Electrical Engineering work as may have been designed or executed by himself, together with the necessary working drawings and specifications. Copies of any publications which he has made subsequent to his graduation may also be submitted. Such report with all its accompaniments will be submitted to a referee or referees appointed by the Syndicate, who shall consider whether the work is original enough and of sufficiently high merit to warrant the conferring of the degree without the ordinary examination. The referee or referees shall have the option of calling the candidate and examining him orally or by setting a paper in connection with the work presented by the candidate.
- (b) A candidate may submit a detailed account of any practical work or any research carried out by him since graduation, in any of the following branches of Engineering (Civil, Mechanical or Electrical) approved by the Academic Council on the recommendation of the Board of Studies in Engineering and submit to an examination in the branch in which he has thus specialized:—

(1) Building Materials and Construction and Structural Engineering,

(2) Bridges and Railways,

(3) Hydraulics and Irrigation,

(4) Municipal Engineering and Town Planning,

(5) Steam Engine and Turbine, construction and design,(6) Internal Combustion Engine, construction and design,

(7) Machine Tools, construction and design,

(8) Hydraulic Machinery, construction and design,

(9) Generation, Transmission and Distribution of Electrical Energy,

(10) Electrical Power and Lighting,

(11) Design of Electrical Machinery, Apparatus and Instruments,

(12) Any other branch of Engineering approved by the Academic Council on the recommendation of the Board of Studies.

R. 201.

Examination in each case will be determined in the main by the candidate's own work and he will be expected to show a thorough knowledge on the practical and working side of the special subject selected by him. In addition, he will be expected to show a general acquaintance with the whole branch of Engineering which includes his subject. The Examiners shall have full discretion to impose such written, oral, or practical test as may be considered necessary by them.

DARMINATIONS

(28).—BACHELOR OF SCIENCE (TECHNOLOGY).

Admission.

O. 247A. A cand must produc

A candidate for the examination for the Degree of B. Sc. (Tech). must produce a certificate to the effect that he has passed the examination for the degree of B. Sc. of this University with at least a second class with Chemistry (Principal) and Physics (Subsidiary) as his subjects or has passed an examination equivalent thereto; and in addition he must have completed a course of study as laid down in Regulation 201A and Regulation 201B in an Institution recognised by the University for the purpose. The Degree of B. Sc. (Tech.), however, shall not be conferred until he has also fulfilled the requirements laid down in Regulation 201C and Regulation 201D or Regulation 201 E.

A candidate who has failed to pass the examination for the B. Sc. (Tech.) Degree may appear at a subsequent examination on the submission of a new application, the payment of a fresh fee and the production of a certificate that he has, during the period between the declaration of his failure and subsequent reappearance for the examination, pursued courses of study in the subjects of the examination to the satisfaction of the Head of the Institution from which he appears.

R. 201A.

The course of study for the degree of B. Sc. (Tech.) shall be (1) Textile Chemistry or (2) Chemical Engineering and shall be of four terms' duration.

R. 201B.

In the following subjects, which are other than those covered by the papers under Regulation 201F, the Head of the Institution shall hold the examination and shall certify that the candidate has satisfied him in those subjects:—

1. Chemical Engineering (Introductory).

2. Industrial Organisation and Industrial Relations.

3. Colloids.

4. Descriptive Engineering.

5. Fuels.

6. Plant employed in the Dyestuffs Industry.

7. Manufacture of Yarn and Cloth (Textile Chemistry students only).

8. Practical Mathematics (Chemical Engineering students only).

9. Principles of General Engineering (Chemical Engineering students only).

Construction of Works.
 Costing and Estimating.

12. Design Applied to Textile Printing (Textile Chemistry students only).

R. 201C.

Every candidate for the degree of B. Sc. (Tech.) shall pass the translation test in German prescribed for the M. Sc. or shall satisfy the examiners in a translation paper of two hours' duration containing a passage or passages in German to be translated into English. The subject matter of the passage or passages set for translation shall be

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relevant to the subjects studied by the candidate during his course for the B. Sc. (Tech.) No marks shall be assigned to this paper but the examiners shall report the cases of candidates who fail to satisfy them in this paper.

A candidate may appear for this paper after the expiry of two terms only. A candidate who has failed in this paper may appear again at a subsequent examination.

- R. 201D. Each student in Textile Chemistry shall be required to spend at least three months in the applications of dyestuffs to textiles in an approved works, and shall submit satisfactory reports to the Head of the Institution.
- R. 201E. (a) Each student in Chemical Engineering shall be required to spend at least three months in an approved chemical factory or in a mechanical workshop where chemical plant is manufactured, and shall submit satisfactory reports to the Head of the Institution.
 - (b) He shall also be required to solve a question on design of the type for the home paper of the Institution of Chemical Engineers. This question shall be set by the Head of the Institution in consultation with the Reader in Chemical Engineering not less than three months prior to the final examination of the B. Sc. (Tech.), and shall be placed before the examiners appointed for this examination as paper No. 5.
- R. 201F. Candidates shall be examined in the following subjects. Each paper and each day's practical examination shall carry 100 marks.

I.—TEXTILE CHEMISTRY

Papers.

(1)	General Chemical Technology	•••		1	Paper.
(2)	Chemistry of Textile Fibres and Dyeing			1	Paper.
(3)	Technology of Dyeing and Printing				Paper.
(4)	Technology of Bleaching, Mercerising and	Finishing	ç	1	Paper.
(5)	Chemistry of Intermediates and Dyes		•••	1	Paper.

Practical and Oral Examination.

(1)	Dyestuffs, Intermedia	ates and	General C	hemical	0	7
	Technology	•••	•••	•••	0	Days.
(2)	Dychouse Practice	•••	•••	•••	3	Days.

II.—CHEMICAL ENGINEERING.

	Papers.			
(1)	General Chemical Technology	1		Paper.
(1) (2)	(a) Materials of Construction	}	1	Paper.
(3)	(b) Conveyance and Storage of Materials Production and Transference of Heat		1	Paper.
(3) (4)	Treatment of Materials		1	Paper.
(5)	Design of Chemical Plant (Home Paper aper Regulation 201 E. (b).)	12	1	Paper.

Practical and Oral Examination.

(1)	Drawing	 	1 Day.
(2)	General Chemical Technology	 	1 Day.
	Chemical Engineering	 	4 Days.

Note:—50% of the marks allotted for the examination in Drawing shall be reserved for the drawings executed by the students during their course.

R. 2016. Marks up to a maximum of 100 shall be assigned by the examiners for the work done in the institution on the strength of the report of the Head in consultation with a member or members of the staff under whom the candidate has carried out the work and on the inspection of the candidate's journals which shall be produced at the

time of the examination.

Standard for Passing the Examination.

R. 201H. To pass the examination, a candidate must obtain at least 40 percent of the marks in each paper and at least 40 percent. of the marks in each practical examination, and at least 40 percent. of the marks assigned for the work done in the Institution, and in addition he must obtain at least 50 percent of the total number of marks assigned to the whole examination.

Successful candidates who obtain 70 per cent. or more of the total marks shall be declared to have passed with distinction.

Syllabus.

FIRST YEAR—LECTURES.

1. German-30 Lectures

R. 2011. Reading and composition for the purpose of giving facility in the interpretation of German books and papers on technical and scientific subjects.

2. Chemical Engineering (Introductory)-30 Lectures

Materials used in chemical plant construction. Principles of heat transmission and of the flow of liquids. Measurement and control of temperature. Methods of heating and cooling. Storage and transportation of solids, sludges, liquids and gases. Unit types of plant employed. Agitation, distillation, evaporation, concentration, pumping, filtration, drying, pulverising, mixing, etc. Methods of sampling.

3. Chemical Engineering-15 Lectures

Conveyance and Storage of Materials.

Methods of measurement of gases and liquids and the laws governing their flow. Viscosity. Friction. Turbulent flow. Stream line flow. Resistance of pipe lines, flues, conduits, etc. Calculation of power required to pump fluids. General survey of plant involved. Pumps, Blowers, Acid elevators. Compressors. Hydraulic presses.

Plant and equipment for conveyance and storage of solids, emi-fluids, liquids and gases. Manual conveyance. Mechanical

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transport. Conveyors. Elevators. Pneumatic transport. .Tet. apparatus for transport of gases, liquids and solids.

4. General Chemical Technology—30 Lectures

Technology of water. Sulphuric acid. Common salt. Hydrochloric acid. Soda ash and allied industries. Electrolytic industries: caustic soda, chlorine, hypochlorites, perchlorates, persulphates, permanganates. Products of electric furnace, graphite, silicon carbide, alundum, calcium carbide, aluminium, magnesium and sodium. Fixation of nitrogen; synthetic ammonia, cyanamide, nitric acid. Nitrogenous, potassium and phosphatic fertilisers. Lime, cement and plaster. Clay, brick and pottery. Glass. Industrial gases. Distillation of wood. Wood pulp and paper. Sugar, starch and glucose. Fermentation industries: alcohol, butyl alcohol, acetone, glycerine, acetic, lactic and citric acids. Glue and gelatine. Explosives. Resins and plastics.

5. Industrial Organisation and Industrial Relations-15 Lectures.

Introductory.

Elementary notions regarding economic concepts. Production. Value. Exchange. Distribution. Money. An outline of the economic organisation of India, with special reference to industries. Industrial possibilities and problems of the Bombay Presidency.

Business Organisation and Finance.

Business units, partnerships and companies. Raising of capital in different forms and their peculiarities. Loans. Managing agency system. Over-trading.

Industrial Organisation.

Planning of work and control of production. The problem accentuated by modern developments. Recent attempts at solution. and trusts. Works organisation and management. Departmental and functional organisation. Selection of employees. Training. Planning. Graphical and statistical control. Purchasing and stores organisation. Marketing arrangements. Policy of discriminating protection for industrial progress in India. Legislation affecting the chemical industry.

Industrial Relations.

Influence of type of business on relationships. Factory legislation. Inspection of factories. Improvement of factory conditions. Welfare work. Statutory and voluntary schemes, their spheres and limits. Accident prevention. Occupational diseases. "Safety First" movement. Training and educational schemes in the factory. Works magazines. Trade Unions and Employers' Associations. Methods and spheres of schemes of joint consultation. Strikes and lockouts. Arbitration.

6. Colloids-15 Lectures

General nature and properties of colloidal systems. Colloidal electrolytes, with special reference to soaps. Imbibition of gels. Technical applications of electric osmosis and cataphoresis. Emulsification and the properties of emulsions. De-emulsification, with special reference to oilfield emulsions and condenser water emulsions. Applications of colloid chemistry in dyeing, rubber manufacture, manufacture of artificial silk, etc. The colloidal properties of clay, with reference to its use in the manufacture of ceramics and refractories. Colloidal properties of pigments. Wetting power. Foams and the process of flotation. Disperse systems in gases. Dust Explosions. Prevention and treatment of smoke.

7. Descriptive Engineering —30 Lectures (Revised).

Properties and generation of steam. Boilers, economisers, superheaters, feed pumps, natural and artificial drafts. Steam engines, turbines and condensers. Gas and oil engines. Governors. Pressure indicators. Indicator diagrams. Indicated and brake horse power. Dynomometers. Thermal and mechanical efficiencies. Transmission of mechanical energy. Lubrication and lubricants. Generation, transmission, and measurement of electrical energy, A. C. and D. C. Power factor. Types of electric motors. Transformers. Load factor. Conductors and insulators. Switchgear. Conversion of 3 phase to single phase, A. C. to D. C. Elementary surveying.

8. Fuels—15 Lectures.

Types of Indian coals, as classified according to geological and geographical distribution. Classification and selection of solid fuels (chiefly coal) for specific purposes. Sampling and proximate analysis of coal. The carbonisation assay of coal. Theory and modes of combustion of solid, liquid and gaseous fuels. Carbonisation industries. Efficiency in boiler plant. Prevention and treatment of smoke nuisance. Petroleum oil and synthetic fuels. Surface combustion. Natural gas. Examination of oil fuels. The control of oil-burning installations.

9. Plant Employed in the Dyestuff Industry—15 Lectures.

Distillation of Coal Tar—Separation of benzene, toluene, xylene, naphthalene, acenaphthene, anthracene, phenol, cresols. Plant employed in the distillation of coal tar and in the fundamental processes for the preparation of intermediates and dyes.

10. Chemistry of Intermediate Products and Dyes (Introductory)—15 Lectures.

Raw materials. Sulphonation, alkali fusion, nitration, reduction and alkylation. Intermediate Products. Classification of dyes according to their chemical structure.

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11. General Technology of Oils, Fats and Waxes-15 Lectures.

Natural occurrence, chemical nature of fats. Properties and structure of fatty acids and more notable alcoholic constituents. Physical and chemical methods employed in the examination and identification of oils, fats and waxes; separation of components. Chemical composition of the more important classes of oils. Study of the nature of oils, fats and waxes, available in India.

Methods of preparation of animal and vegetable oils and fats industrial purposes. Extraction, refining, hydrogenation. Edible oil industry. Methods of hydrolysing, oils and fats, e. g. autoclave, Twitchell, enzyme, etc. Manufacture of soap and glycerine. Use of facts and waxes in paints, pigments and varnishes. Application of fats to fibres.

12. Manufacture of Yarn and Cloths 15-Lectures.

The cotton fibre, its preparation and the spinning of yarn. The sizing of yarn and the preparation of thread for the loom. Manufacture of grey and coloured fabrics. Fabric construction. The principal base weaves. Selection of materials and cloth analysis. Common defects in fabrics, their causes and remedies. Calculations. Methods of counting yarns and the calculation of the weights of yarns required for fabrics of given types. Testing of fibres, yarns and fabrics.

13. Chemistry of Textile Fibres and Dyeing (Introductory)-30 Lectures

Chief varieties, methods of production, source, physical structure and properties of cotton, linen, jute, hemp, wool, silk, artificial silks. Action of acids, alkalies and other chemical agents. Immunisation.

Classification of dyes according to their dyeing properties. Application of different groups of dyes to various fibres. After freatment of dyed materials. Assistants and mordants used in dyeing. Stripping agents.

Practical Mathematics-15 Lectures

Practical calculations involving the use of the slide rule and logarithms. Applications of the differential and integral calculus. Graphs. Simple differential equations of importance to engineers. Elements of vector algebra.

Statics of two dimensions with application of the calculus and of the principle of virtual work. Frame works, funicular and force polygons. Graphical calculation of stresses and strains. The fundamentals of the theory and design of structures. Strength of materials.

Dynamics of two dimensions, including elementary rigid dynamics. Use of the principles of conservation of energy and momentum. Application in a simple manner to the theory of machines. Rectilinear and rotational motion. Balancing. Stresses in moving parts.

15. Principles of General Engineering-15 Lectures

Mechanical properties of timber, metals and alloys, their uses in engineering. Beams, girders, pillars, etc. Concrete brick work and asphalt. Breaking stresses, safety factors, dead and live loads. Castings and forgings. Bolts, nuts, keys, cotters, etc. Welding, riveting, etc. Hand and machine tools.

FIRST YEAR LECTURES.

No.	Subject.	Texti Chemis		Chem: Engin	ical eering.
	(H. 1st	ours per w term. 2nd	term.	(Hours pe 1st term. 2	er week.) and term.
1.	German	1	1	1	1
2.	Chemical Engineering (introductory)	1	1	1	1
3.	Chemical Engineering (Con-				
	veyance and Storage of				4
4.	Materials) General Chemical Technology	1	1	1	$\frac{1}{1}$
5.	Industrial Organisation and		-	•	•
	Industrial Relations		1		1
6.	Colloids		1		1
7.	Descriptive Engineering		1		1
8. 9.	Fuels Plant Employed in the Dyestuff	1		1	•••
J.	Industry		1		1
10.	Chemistry of Intermediate Pro-	•••	-	•••	_
	ducts and Dyes (Introductory).	1			
11.	General Technology of Oils,				
	Fats and Waxes	1		1	
12. 13.	Manufacture of Yarn and Cloth	1	•••		•••
10.	Chemistry of Textile Fibres and Dyeing (Introductory)	1	1		
14.	Practical Mathematics	Т	7	1	•••
15.			•••		•••
	neering			1	•••
	Total	8	8	7	8
		The state of the s			

FIRST YEAR-PRACTICAL WORK.

16. Engineering Drawing.

Solid geometry. Principles of projection and definition of terms. Projection of points and lines. Projection of solids placed in simple positions. Plans and elevations of solids. Simple cases of intersection and development of surfaces. Machine drawing. Use of instruments. Use of scales. Freehand sketching of machine details from models and from machine parts. Preparation of detail and assembly drawings to scale. Lettering and titling. Dimensioning.

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17. Workshop Practice

Use of hand and machine tools. Fitting, chipping, filing, scraping, screwing and tapping. Use of scribing block. Gauges and squares. Soldering, brazing, machining, drilling, boring, turning, milling, smithy work. Wood work.

18. Fuel Laboratory

Sampling. Chemical and physical analysis of fuels. Calorimetry Pyrometry. Gas analysis.

19. Technical Chemistry Laboratory (Textile Chemistry).

Analysis of stores such as acids, alkalies, salts, soaps, oils, bleaching agents, reducing agents, intermediates for dyes, etc. Water analysis. Preparation of typical products used in the textile industries.

20. Technical Chemistry Laboratory (Chemical Engineering).

Distillation processes. Extractions. Continuous reactions. Catalytic reactions. Investigation of works processes on a laboratory scale. Application of phase rule methods.

21. Experimental Dyeing

Comparison of affinities of different groups of dyes for various fibres. Use of assistants, mordants and auxiliaries. Application of direct, developed, basic, acid, mordant and vat colours. Aftertreatment of dyed fabrics. Colour matching. Evaluation by comparative dye trials.

22. Chemical Engineering Laboratory

Measurement of the flow of fluids in pipes. Determination of the viscosity of liquids and gases. Experiments illustrating turbulent and stream line flow. Determination of the resistance of pipe-lines. Effect of bends and joints. Characteristics of pumps for liquids and gases. Preparation of chemical products on a semi-technical scale. Measurement of pH.

FIRST YEAR PRACTICALS

No.	Subject.	The second second second second	tile listry.	Chem Engine	
		(Hours p lst term.	per week.) 2nd term.	(Hours per 1st term, 2r	
16.	Engineering Drawing	. 5	•••	5	5
17.	Workshop Practice		5	6	6
18.	Fuel Laboratory		5	5	•••
19.	Technical Chemistry Laborator	ry 10	10		•••
20.	Do. Do.			10	•••
21.	Experimental Dyeing	. 10	5		•••
22.	Chemical Engineering Labora	-			-11
	tory		•••	•••	14
	Total	. 25	25	26	25

SECOND YEAR LECTURES—TEXTILE CHEMISTRY.

23. Construction of Works-15 Lectures

Evolution of the factory. Location and sites for new factories. Preliminary considerations:—Supply of labour, raw materials, water, fuel, and power. Transport facilities. Use of existing buildings. Local amenities. Basic, intermediate and tributary industries. Relation of site to market. Competitive industries. Climatic conditions.

Purchase of land. Types of buildings. Layout of the building with considerations of future extensions. Foundations and drainage system, with considerations for various types of subsoils. Details of factory construction.

Precautions against fire, accident, floods and lightning. Chimneys and calculation of their strength. Guarding of machinery. Lighting, ventilation and heating of buildings. Dust extraction. Sanitary accommodation. First aid accommodations.

24. Costing and Estimating-15 Lectures

Items involved in the cost of production. Preparation of flow-sheets, (material, energy, time). Determination of cost of plant from plans and specifications. Land. Roads. Fencing. Offices. Capital charges. Depreciation. Interest. Amortisation. Cost of raw materials. Cost of labour of various kinds. Supervision charges. Services; gas, water, power, steam. Stores. Repairs. Rates, taxes, insurance. Value of by-products. General overhead charges. Packing charges. Transportation charges. Selling charges. Margin of profit on the capital expended.

25. Chemistry of the Colouring Matters (Advanced)—60 Lectures

History of the dyestuff industry. Intermediates of the benzene naphthalene and anthracene series. Relation between colour and chemical constitution. Nitroso, nitro, azo, pyrazolone, stilbene, thiazol, ketonimine, triphenylmethane, xanthene, acridine, indamine, indoaniline, indophenol, oxazine, azine, thiazine, quinoline, anthraquinone, indigoid, and sulphur dyes. Mordant dyes and the theory of lake formation. Chemistry and technology of the more important natural dyes, such as madder (munjeet), alkanet, logwood, lac dye, safflower, catechu, indigo, old and young fustic, cochineal and turmeric.

26. Chemistry of the Textile Fibres and Dyeing (Advanced)—15 Lectures

The chemical constituents of raw cotton. Determination of the purity of cellulose. Constitution and crystalline nature of cellulose. The micellar structure of the cotton fibre. Hydrocellulose and oxycellulose. Action of heat, light and micro-organisms on cotton. Structure of the animal fibres and the chemistry of their constituents. Theories of dyeing. Chemistry of mordants and lakes. Fastness tests and standards. Methods of improving the fastness of dyed fabrics.

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27. Technology of Dyeing and Printing-30 Lectures

Historical development of machine dveing. Constructional materials for dyeing equipment and recent progress in the use of stainless metals. Dyeing machinery: loose cotton, hanks, corps and cheeses, warps, piece-goods. Drying machinery. Machinery for artificial silk, wool and silk dyeing. Printing machinery and auxiliary equipment.

Dyeing processes for cotton, artificial silk, wool and employing the various classes of dyestuffs. Dyeing of union material Special effects.

Block, spray, screen, and roller printing. Styles of printingdirect, dyed, discharge, resist. Thickening agents, mordants and assistants. Colour mixing. Printing processes. Treatment of the material after printing. Common printing faults.

28. Technology of Bleaching, Mercerising and Finishing-30 Lectures

Impurities in raw cotton and grey cloth; physical and chemical processes involved in their removal. Desizing agents and the mechanism of desizing. Materials used in scouring and bleaching detergents, wetting out and bleaching agents.

Singeing, scouring and bleaching machinery: gas and plate singeing machines, kiers, washing machines, hydroextractors, chemicking and souring cisterns, scutchers, open-width machines. Machinery for cotton in forms other than hanks and piece-goods: loose cotton, cops, cheeses, etc. Examples of bleaching processes. Faulty bleaching. Stains and their removal. Chemical and mechanical tests for damage to the cellulose during bleaching.

Mercerisation. Early history and development. Physical and chemical aspects of mercerisation. The factors determining the efficiency of mercerisation: strength of the lye; temperature, tension, and after-treatment such as washing, recuperation and souring. Tests for mercerisation. Mercerising machinery for yarn and cloth.

Finishing. Materials employed: starches, filling and stiffening materials, softening agents, deliquescents, antiseptics. Types of finishes: pure, assisted, stiffened and special. Finishes required for various materials. Water-proofing and fire-proofing. Finishing machinery: water-mangles, padding and back-starching machines, drying machines, stenters, conditioning machines, calenders (swissing, chasing, friction, Schreiner), beetling machines,

29. Design Applied to Textile Printing-15 Lectures

Decorative effects arising from technical processes, and fibrous Bases of ornament. Colour effects. Harmonies and contrasts. Types of pattern used for different purposes. Distinctive features of the more important styles of ornament.

SECOND YEAR PRACTICAL WORK-Textile Chemistry.

30. Technical Chemistry Laboratory

Examination of dyes in substance. Separation of mixtures of intermediates and of dyes. Analysis of dyes. Analysis of mordants and weighting on the fibre.

31. Dyehouse

Bleaching of loose cotton. Yarn and cloth testing. Kier-boiling, washing, souring and bleaching of yarn. Singeing, desizing, scouring, washing and bleaching of cloth. Hypochlorite, peroxide and other bleaches. Bleaching of coloured goods. Mercerisation of yarn and cloth. Dyeing of loose cotton, hanks, cops, cheeses and piece-goods; use of open dye-becks, Krantz, Obermaier, and Franklin machines, jiggers and padding machine. Printing: single and multicolour; discharge, resist, cover, crepon, and special effects. Ageing and developing. Spray printing. Finishing: starching, drying, damping, stentering, calendering and folding. Bleaching, dyeing and finishing of wool, silk, rayon and union materials. Costing of processes.

32. Experimental Dyeing

Methods of conducting exact comparative dye trials. Identification of dyes on the fibre. Stripping agents. Detection of mordants. Reproduction of dyed styles. Fastness tests. Analysis of fibres.

33. Practical Microscopy

The optics of the microscope. The use of the microscope in textiles. Examination of various fibres and cloths under the microscope. Preparation of simple mounts in liquids. Pith and cork embedding. Preparation of mounts for the cross-sections. Identification of fibres by the microscope. Examination for faults. The use of polarised light. Photomicrography.

SECOND YEAR LECTURES-Chemical Engineering.

- 23. Construction of Works—15 Lectures (Same as for Textile Chemistry).
- 24. Costing and Estimating 15 Lectures (Same as for Textile Chemistry).

34. Advanced Chemical Engineering 120 Lectures

Production, transference and conservation of heat—Combustion. Furnaces. Theory of heat transfer. Design of furnaces including electric furnaces. Calculation of heat losses and of heat transfer through composite walls. Control of furnaces. Refrigeration. Thermodynamics of refrigeration. Refrigerants. Heat exchangers, coolers, heaters, recuperators. Theory and practice involved.

Treatment of materials—Size reduction, crushing, disintegrating, wet and dry grinding. Output, power input. Work done in size reduction. Mixing, agitating and homogenising. Mechanical, hydraulic, air, electrostatic and electromagnetic separation. Flotation, sedimentation and filtration. Filter media. Filtration plant. Theory of filtration. Theory and practice of centrifugal machines. Dust and tar extraction. Leaching and extracting. Continuous and countercurrent extraction. Handling of inflammable solvents. Evaporation. Entrainment and its prevention. Rate of evaporation. Consumption of heat. Multiple effect evaporation. Evaporation under reduced pressure. Efficiency of evaporators. Distillation and condensation. Theory and practice of fractional distillation. Continuous and batch distillations. Crystallisation. Drying of solids and liquids. Humidification and dehumidification of gases. Absorption and adsorption. Purification of gases.

Materials used in the construction of chemical plant—Corrosion. Materials of construction. Iron and steel. Alloy steels. Chemical cast iron. Lead, copper, tin, zinc, nickel, silver, etc. Timber and its utilisation. Cements and lutes. Chemical pottery and stoneware. Refractories.

Design and layout of chemical plant.

The physical, physico-chemical and engineering principles governing the design, layout and operation of plant, for the processes employed in chemical industry. Optimum conditions for operation. Ease of control. Facilities for repair. Design and construction of plant units such as tanks, reaction vessels, montejus, autoclaves.

SECOND YEAR PRACTICAL WORK—CHEMICAL ENGINEERING.

Chemical Engineering Laboratory 35.

Heat loss through a lagged surface. Heat loss through a furnace wall. Heat transfer to liquids and gases flowing in tubes. Heat transfer to boiling liquids. Heat transfer from condensing vapours. Heat balance of a boiler trial. Grinding, mixing. Filtration and centrifugal separation. Vacuum evaporation in single and double effect. Fractional distillation, steam distillation and distillation under reduced pressure. Extraction. Drying. Process experiments illustrating typical methods used in the chemical industry.

36. Drawing Office

Preparation of drawings for chemical plant units. Calculations. Preparation of plant layouts from flow sheets.

37. Workshop Practice

Fabrication of simple chemical plant units.

[Part II

SECOND YEAR LECTURES.

No.	Subject.		xtile nistry.	Chen Engine	
	1	(Hours p st term.	er week.) 2nd term.	(Hours pe	r week.) and term.
23.	Construction of Works	. 1		1	
24.	Costing and Estimating		1		1
25.	Chemistry of the Colouring				
	Matters (Advanced)	. 2	2	•••	•••
26.					
	and Dyeing (Advanced)		•••	•••	
27.	Technology of Dyeing and				
00	Printing		1	•••	•••
28.	0.				
90	Mercerising and Finishing		1	•••	•••
29.	Design Applied to Textile	9	4		
21	Printing Advanced Chemical Engineer	••••	1	•••	•••
or.	ina			1 30	
	ıng	• • • •	•••	4	4
	Total	. 6	6	5	5
	2.00112		0	U	U

SECOND YEAR PRACTICALS.

No.	Subject.	(Text Chemi			emical neering.
		(Ho	urs pe rm. 2r	r week.)	(Hours 1	per week.) 2nd term.
30.	Technical Chemistry	Labora-				
	tory		10	10		
31.	Dyehouse		12	12		
32.	Experimental Dyeing	g)				
	Laboratory	}	5	5		
33.	Practical Microscopy				•••	•••
35.	Chemical Engineering	o.				
	Laboratory	9				
36.	Drawing Office		•••	•••	15	15
37.	Workshop		•••	•••	5	5
٠	Workshop		•••	•••	6	6
	Total		27	27	26	26

(29).—MASTER OF SCIENCE (TECHNOLOGY).

0. 247B.

Any person who has passed the B. Sc. (Tech.) examination of this University not less than one academic year previously may be admitted to the examination for the degree of M. Sc. (Tech.). The candidate has been formally admitted to the degree of B. Sc. (Tech.)

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and has satisfied the requirements laid down in R. 201J or R. 201K, and also R. 201L, R. 201M, R. 201N, and R. 2010.

A candidate who has failed to obtain the degree of M.Sc. (Tech.) may re-submit his thesis after revision.

R. 201J.

The degree of M.Sc. (Tech.) may be awarded to a candidate who has passed the examination for the B.Sc. (Tech.) and who has subsequently carried out research in the University Department of Chemical Technology under the guidance of a University Teacher for at least two terms on the merits of a thesis dealing with a subject relating to Textile Chemistry or Chemical Engineering.

R. 201K.

Notwithstanding the conditions laid down in R. 201 J, the degree of M.Sc. (Tech.) may be conferred on a candidate who has passed the examination for the degree of B. Sc. (Tech.) at least two years previously, provided that he has been satisfactorily and continuously engaged in industry during that period and presents, under the guidance of a University Teacher, a thesis embodying the results of the work in which he has been engaged and which, in the opinion of the referee, is a contribution of value to industry and on which he satisfactorily undergoes a viva voce examination by an external examiner in conjunction with the teacher under whom he has been receiving guidance.

R. 201L.

The candidate shall submit a certificate signed by the teacher under whom he has worked stating that there is a prima facie case for the consideration of the thesis. Such certificate shall be regarded as satisfying the Board of Studies that the candidate has done sufficient work to enable him to appear for the examination.

R. 201M.

Theses may be submitted at any time during the year. A candidate shall give notice of his intention to submit his thesis at least two months before the date on which he intends to submit the same. In such notice the candidate shall state the title of the thesis and the name of the University Professor or University Teacher under whom he has worked, or by whom he has been guided, and he shall also indicate generally the nature of the results of his work. The candidate shall forward his thesis to the Registrar through his University Professor or University Teacher along with his form of application for admission to the examination and a fee of Rs. 100.

R. 201N.

A candidate shall submit three copies of the text of his thesis (with one set of preparations and diagrams, if any) together with a synopsis and a statement indicating to what extent his work is original, and to what extent it is borrowed from others. The thesis shall be the candidate's own work carried out under the guidance or supervision of his Teacher.

R. 201 O.

The Board of Studies shall suggest to the Academic Council the name of one referee who shall not be the University Professor or University Teacher under whom the candidate has worked, to whom the thesis shall be submitted and who shall, after consulting the University Professor or University Teacher who has been guiding the student, report through the Board to the Academic Council, whether he recommends that the thesis be accepted for the degree or rejected. The report of such referee shall be final. If the referee

recommend that the thesis be accepted, the candidate shall be declared to have qualified for the degree.

(30)—DOCTOR OF SCIENCE (D. Sc.)

- 0. 247C.
- The Degree of Doctor of Science may be conferred :-
- (a) Upon Graduates of Science, Science (Tech.), Engineering, Agriculture, upon Bachelors of Arts with Mathematics and Science of the University and Graduates in Medicine, and Surgery, who have carried on research in Anatomy, Bacteriology, Pathology, Pharmacology, or Physiology.

(b) Upon Masters of Science, Science (Tech.), Engineering and Agriculture and upon Masters of Arts with Mathematics or

Science of the University;

- (c) Upon Masters of Science, Science (Tech.), Engineering and Agriculture and upon Masters of Arts with Mathematics or Science of other Universities recognized by this University, and upon graduates in Science of this University and other Universities recognized by this University who are Associates of the Indian Institute of Science and who have prosecuted research for not less than two years within the Presidency of Bombay; and
- (d) Upon Doctors of Philosophy of this University and of other Universities recognized by this University.
- 0. 247D.

The degree may be conferred, for published work, which was undertaken mainly on his own initiative and which is deemed by competent judges to be a valuable contribution to Science, upon a candidate who must have at least two years' standing as a Doctor of Philosophy or three years' as a Master or six years' as a Bachelor.

0. 247E.

A candidate for this degree may apply to the Registrar at any time in the year to be admitted to the degree. A candidate shall submit with his application four copies of the published work.

A candidate will not be permitted to submit work for which a Degree has been conferred upon him by this or any other University; but he shall not be precluded from producing such work in support of his application by way of proof that he has done other original scientific work which has received academic recognition either from this or any other University. The application shall clearly specify which of the published work has previously received recognition.

- R. 201P.
- The candidate shall indicate what has been done by other workers in the same subjects and what he claims as his own, and shall indicate also the extent to which he has been advised or assisted during the work. He may support his application by giving proof of having done other original scientific work.
- 0. 247F.
- A candidate shall pay a fee of Rs. 200 at the time of making his application.
- 0. 247 G.
- The work and supplementary papers, if any, shall be referred to three Examiners, named by the relevant Board of Studies and approved by the Academic Council.
- 0. 247H.
- The Examiners shall make a joint report to the Registrar for submission to the Academic Council stating whether they consider

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the work to be a valuable contribution to learning and deserving of the degree. The Academic Council shall then send its recommendation thereon to the Syndicate.

0. 247 I. The Degree of Doctor of Science shall not be conferred as an ad eundem degree.

O. 247J. A work that has been rejected may be re-submitted after due revision and subject to the provisions of Ordinances 247 E and 247 F.

BACHELOR OF LAWS.

*OLD REGULATIONS.

General.

Candidates for the Degree of LL.B. must have obtained the Degree of B.A. or B.Sc., B.Com., M.A. or M.Sc., in this University, or in a University recognized by this University, and will be required to pass two examinations in Law, the first to be called the First Examination for the Degree of LL.B., and the second, the Second Examination for the Degree of LL.B.

(31).—FIRST LL. B. EXAMINATION (OLD RULES).†

Admission.

No candidate will be admitted to this examination unless he shall have obtained the Degree of B.A. or B.Sc., B.Com., M.A. or M.Sc., in this University, or in a University recognized by this University, and have, after passing the examination for the said Degree, kept two terms in a Law College affiliated to this University.

R. 202. Candidates will be required to answer the following six papers carrying 100 marks each:—

Paper I.—Roman Law. Paper II.—Jurisprudence.

Paper III.—Constitutional Law.

Paper IV .- Law of Contracts.

Paper V.—Law of Crimes and Criminal Procedure.

Paper VI.-Law of Torts and Easements.

R. 203. Text books on the subject matter of the above papers will be prescribed or recommended from time to time by the Academic Council on the recommendation of the Board of Studies.

Standard for Passing the Examination.

R. 204. To pass the examination the candidate must (a) obtain one-third of the full marks in each paper, and (b) obtain one-half of the total

^{*}The existing Ordinances & Regulations shall continue in force till April 1940 and 1941 for the First LL. B. and the Second LL. B. examinations, respectively (vide Transitory Ordinance 250 B).

[†]The First LL.B. examination under the old Regulations will be held for the last time in April 1940.

marks obtainable. Should a candidate, however, fail to obtain the prescribed minimum for passing in one paper only, he shall be declared to have passed the examination if, on a review of his marks, a majority of not less than two-thirds of the Examiners present at the final meeting decide that he should pass: Provided always that no candidate shall so pass unless he obtains at least 60 per cent, of the total marks in all papers. Those of the successful candidates who obtain two-thirds of the total marks obtainable will be placed in the First Class.

*R. 205.

A candidate who has obtained 50 per cent. marks separately in two or more papers at any one examination may, at his option, be exempted from appearing in those papers at a subsequent examination and will be declared to have passed the examination when he passes in the remaining papers: Provided that in the paper or papers in which he appears on the last occasion he must obtain the minimum in each paper and the percentage of the total marks in such paper or papers required by Regulation 204. Such candidates will not be eligible for a class, prize or scholarship awarded at the examination.

(32).—SECOND LL. B. EXAMINATION (OLD RULES).†

Admission.

0. 250.

No candidate will be admitted to this examination unless he shall have passed the First Examination for the Degree of LL.B. in this University, and, after passing the said examination, shall have kept two terms in a Law College affiliated to this University.

0. 251.

A student who has passed in all subjects but one at the First LL. B. Examination in conformity with Regulation 205 will be allowed to keep terms and to appear for the Second LL. B. Examination after keeping two terms, but will not be declared to have passed the Second LL. B. Examination under any circumstances, unless he has passed in the remaining subject of the First LL. B. Examination held either in a previous, or in the same examination season.

R. 206.

Candidates will be required to answer the following six papers carrying 100 marks each :—

Paper I.—Hindu Law (including the Hindu Law of Succession and Inheritance.)

‡Paper II.—Mahomedan Law and the Law of Succession.

Paper III.—Law of Property and Land Tenures (excluding the Law of Mortgage).

for the last time in April 1941.

^{*} This regulation came into operation from January 1928 and does not affect exemptions from single papers earned under the old Regulation. + The Second LL. B. examination under the old Regulations will be held

Comparative Questions relating to Succession and Inheritance may be asked in Paper II.

Chap. XXXIV] SECOND LL. B. (OLD): STANDARD FOR PASSING

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Paper IV.—Equity, with special reference to Trusts, Specific Relief and Mortgages.

Paper V.—The Law of Evidence, Civil Procedure and Limitation. Paper VI.—Company Law and the Law of Insolvency.

R. 207. Text-books on the subject matter of the above papers will be prescribed or recommended from time to time by the Academic Council on the recommendation of the Board of Studies.

Standard for Passing the Examination.

- R. 208. To pass the examination the candidate must (a) obtain one-third of the full marks in each paper and (b) obtain one-half of the total marks obtainable. Should a candidate, however, fail to obtain the prescribed minimum for passing in one paper only, he shall be declared to have passed the examination if, on a review of his marks, a majority of not less than two-thirds of the Examiners present at the final meeting decide that he should pass: Provided always that no candidate shall so pass unless he obtains at least 60 per cent. of the total marks in all papers. Those of the successful candidates who obtain two-thirds of the total marks obtainable will be placed in the First Class.
- *R. 209. A candidate who has obtained 50 per cent. marks separately in two or more papers at any one examination may, at his option, be exempted from appearing in those papers at a subsequent examination and will be declared to have passed the examination when he passes in the remaining papers: Provided that in the paper or papers in which he appears on the last occasion he must obtain the minimum in each paper and the percentage of the total marks in such paper or papers required by Regulation 208. Such candidates will not be eligible for a class, prize or scholarship awarded at the examination.
- R. 209A.

 (Transitory.)

 Notwithstanding anything contained in the Regulations relating to the First and Second LL.B. Examinations, a candidate for the First LL.B. Examination who has obtained exemption in Paper IV (Paper on the law of Contracts and Torts) under the old Regulations, shall be exempted from appearing for Paper IV (Law of Contracts) and Paper VI (Law of Torts and Easements) under the new Regulations, and a candidate for the Second LL.B. Examination who has obtained exemption from Paper I (Succession and Family Rights) under the old Regulation, shall be exempted from appearing in Papers I and II (Family Rights and Succession) under the new Regulations.

The above exemptions shall continue in force till the 30th April 1941.

^{*}This Regulation came into operation from January 1928, and does not affect exemptions from single papers earned under the old Regulation.

REVISED REGULATIONS*

General

O. 248A. Candidates for the degree of LL. B. must have passed the Intermediate Arts, Intermediate Science or the Intermediate Commerce Examination of this University, or the Intermediate Arts, Science or Commerce Examination of any other University or Board of Intermediate Education, recognized as equivalent to the corresponding examination of this University, and will be required to pass two examinations in Law, the first to be called the First Examination for the degree of LL.B., and the second, the Second Examination for the degree of LL.B.

(31A).—FIRST LL. B. EXAMINATION (NEW RULES).*

Admission.

- No candidate will be admitted to this examination unless he shall have passed the Intermediate Arts, Science or Commerce Examination of this University or an equivalent examination of another University or Board of Intermediate Education, and have thereafter kept two terms in a Law College affiliated to this University.
- R. 202A. Candidates will be required to answer the following five papers carrying 100 marks each. Each paper shall be of three hours:
 - Paper I. Roman Law and Broom's Legal Maxims (selected portions).
 - Paper II. Jurisprudence.
 - Paper III. Constitutional Law, English and Indian (General Principles).
 - Paper IV. Torts, Crimes and Criminal Procedure.
 - Paper V. General English, consisting of (1) an essay and preciswriting, and (2) two modern text-books in prose to be prescribed by the Academic Council on the recommendation of the Board of Studies in Law.
- R. 202B. Candidates who have passed the B.A. Examination of this University or the B.A. Examination of any other University recognized by this University as equivalent to the B.A. Examination of this University shall at their option be exempted from Paper V above, provided that candidates who avail themselves of such exemption shall not be eligible for a class, prize or scholarship
- R. 203A. Text-books on the subject matter of the above papers will be prescribed or recommended from time to time by the Academic Council on the recommendation of the Board of Studies.

^{*}The revised Regulations relating to the First and Second LL. B. Examinations came into operation from June, 1938, so that the First LL. B. Examination under the revised Regulations will be held for the first time in April, 1939 and the Second LL. B. Examination, in April, 1940.

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SECOND LL. B. (NEW) : SYLLABUS

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Standard for Passing the Examination

R. 204A.

To pass the examination the candidate must (a) obtain one-third of the full marks in each paper, and (b) obtain one-half of the total marks obtainable. Should a candidate, however, fail to obtain the prescribed minimum for passing in one paper only, he shall be declared to have passed the examination if, on a review of his marks, a majority of not less than two-thirds of the Examiners present at the final meeting decide that he should pass: Provided always that no candidate shall so pass unless he obtains at least 55 per cent. of the total marks in all papers. Those of the successful candidates who obtain two-thirds of the total marks obtainable will be placed in the First Class.

(32A).—SECOND LL. B. EXAMINATION (New Rules).*

Admission.

0. 250A.

No candidate will be admitted to this examination unless he shall have passed the First Examination for the Degree of LL.B. in this University and after passing the said examination, shall have kept two terms in a Law College affiliated to this University.

R. 206A.

Candidates will be required to answer the following seven papers carrying 100 marks each. Each paper shall be of three hours:

Group A

Paper I. Hindu Law.

Paper II. Mohamedan Law and the Indian Succession Act.

Paper III. Equity with special reference to Trusts and Specific Relief.

Group B

Paper IV. The Law of Evidence, Civil Procedure and Limitation. Paper V. The Law of Property, Easements and Land Tenures.

Paper VI. The Law of Contracts, including Partnership, Sale of Goods, Negotiable Instruments and General Principles of Mercantile Law.

Paper VII. Company Law and the Law of Insolvency.

Candidates may take Groups A & B together or separately.

R. 207A.

Text-books on the subject matter of the above papers will be prescribed or recommended from time to time by the Academic Council on the recommendation of the Board of Studies.

Standard for Passing the Examination

R. 208A.

To pass the examination the candidate must (a) obtain one-third of the full marks in each paper and (b) obtain one-half of the total marks obtainable. Should a candidate, however, fail to obtain the prescribed minimum for passing in one paper only, he shall be declared to have passed the examination if, on a review of his marks, a majority of not less than two-thirds of the Examiners present at the

^{*}The Second LL.B. Examination under the New Rules will be held for he first time in April 1940.

final meeting decide that he should pass: Provided always that no candidate shall so pass unless he obtains at least 55 per cent. of the total marks in all papers. Those of the successful candidates who obtain two-thirds of the total marks obtainable will be placed in the First Class.

A candidate who has obtained one-third of the full marks in each paper, and one-half of the total marks obtainable in all the papers of a group, may at his option be exempted from appearing in those papers at a subsequent examination, and will be declared to have passed the examination when he passes in the other group, provided that in the paper or papers in which he appears on the last occasion he obtains the minimum in each paper and one half of the total marks obtainable in the group. Such candidates shall not be eligible for a class, prize or scholarship awarded at the examination.

Transitory Ordinance

0. 250B.

Notwithstanding the revised Ordinances and Regulations governing the courses of study in Law for the First and Second LL.B. Examinations, the existing Ordinances and Regulations shall continue in force till 1940 and 1941 respectively so that the First LL.B. Examination under the old Regulations will be held for the last time in April 1940 and the Second LL.B. Examination in April 1941. The revised Ordinances and Regulations will come into force from the 20th June, 1938, and continue side by side with the old Ordinances and Regulations.

(33).—EXAMINATION FOR THE DEGREE OF LL. M.

Admission.

0. 252.

No candidate shall be admitted to the examination for the Degree of LL.M. unless he has passed, not less than two years previously, the Second Examination for the Degree of Bachelor of Laws in this University or a Degree Examination in Law in some other University accepted by the Academic Council as equivalent thereto.

Note:—Every candidate for the degree of LL. M. must work under the guidance and supervision of the Principal of a Law College affiliated to the University and report himself to the Principal from day to day.

*R. 210.

Candidates will be examined in any one of the following four branches:—

BRANCH I.

First Paper ... Jurisprudence. Second Paper ... Roman Law.

Third Paper
Fourth Paper
Fifth Paper
Sixth Paper
Sixth Paper
Sixth Paper

International Law (Public).
International Law (Private).
Principles of Legislation.
Constitutional Law (Public).

*The last examination under the existing Regulation will be held in June 1939.

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BRANCH II.

First and Second

Papers.

Hindu Law. Mahomedan Law.

Third and Fourth

Papers.

The Law of Wills.

Fifth Paper Sixth Paper

The Law of Marriage and Succession in British India.

BRANCH III.

First and Second Papers.

Real Property (including the Law of Vendors and Purchasers, Mortgages, Gifts and Leases, and the Law relating to Mines and Minerals, Foreshore and Seashore).

Third Paper

Principles of Equity, with special reference to the Law of Trusts and Specific Relief.

Fourth Paper Fifth and Sixth Papers.

The Law of Easements and Prescription. Customary and Statute Law relating to Land Tenure in British India.

BRANCH IV

First Paper Second Paper ... The Law of Contracts in General.

The Law of Agency, Partnership and Companies.

Third Paper Fourth Paper Fifth Paper Sixth Paper

... Maritime Law. The Law of Torts.

Mercantile Law.

The Law of Crimes.

REVISED REGULATION.

(For 1940 & subsequent years.)

*R. 210A.

Candidates will be examined in any one of the following four branches :-

BRANCH I.

Jurisprudence. Paper I Roman Law. Paper II ...

International Law (public and private). Paper III

Principles of Legislation. Paper IV ...

Constitutional Law (British & Indian). Paper V

Essay. Paper VI

BRANCH II.

Paper I Hindu or Mahomedan Law, as the case Paper II may be. Paper III

Paper VI (Essay) Paper IV

Testamentary and Intestate Succession (excluding Hindu & Mahomedan Law).

Marriage, Divorce and Guardianship (ex-Paper V cluding Hindu and Mahomedan Law).

^{*}The first examination under the revised Regulation will be held in June, 1940.

BRANCH III.

Paper I		Real Property (including the Law of Vendors and Purchasers, Mortgages, Gifts and Leases and the Law relating to Mines and Minerals, Foreshore and Seashore.)
Paper III		Principles of Equity, with special reference
Paper IV Paper V Paper VI		to the Law of Trusts and Specific Relief. The Law of Easement and Prescription. Customary and Statute Law relating to Land Tenure in British India. Essay. Branch IV.
		DRANOR IV.
Paper I		The Law of Contracts (including Sale of Goods, Agency and Partnership).
Paper II		Companies and Insolvency.
Paper III	•••	Mercantile and Maritime Law.
Paper IV		The Law of Torts.
Paper V	•••	The Law of Crimes.
Paper VI		Essay.

Standard for Passing the Examination.

R. 211. To pass the examination the candidate must obtain 50 per cent. of the full marks in each paper. Those of the successful candidates who obtain 66 per cent. of the total marks obtainable will be placed in the First Class.

M.B., B.S.

(OLD REGULATIONS.)

General.

*0. 253.

A candidate for the Degrees of M.B., B.S. must have passed the Intermediate Examination in Science of this University with Biology as his optional subject, or an equivalent Examination of another recognized University in the group of Physics, Chemistry and Biology which includes the subject of Organic Chemistry, both theoretical and practical, as a part of the syllabus in Chemistry

Benares Hindu University; Panjab University; Rajputana Board, Ajmer;

Nagpur University; U. P. Board; Delhi University;

^{*} The Intermediate Examinations in Science of the following Universities and Boards in the groups of Physics, Chemistry and Biology have been recognized as equivalent to the Intermediate Examination in Science of this University in the same group for the purposes of the above Ordinance:—

Muslim University, Aligarh (provided the candidate produces a certificate to the effect that he has passed an examination in the additional paper and practical which is necessary for admission to the Panjab Medical College).

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for the said examination, before being eligible for admission to a Medical College affiliated to the University.

- 0. 254. The academic year for medical students shall consist of three terms, each of twelve weeks' duration, viz.:—
 - (i) The Monsoon term commencing on the 4th June and ending on the 26th August.
 - (ii) The Winter term commencing on the 27th August and ending on the 16th December (inclusive of vacation from 8th October to 4th November).
 - (iii) The Spring term commencing on the 14th January and ending on the 7th April.
- 0. 255. Candidates for the degrees of M.B., B.S. shall be required to pass three examinations, namely:—
 - (i) First M.B., B.S. Examination— (Anatomy & Physiology).
 - (ii) Second M.B.,B.S. Examination— (Pharmacology & Materia Medica).
 - (iii) Third M.B., B.S. Examination-Groups A & B.

Subjects of Group A are-

- 1. Medicine.
- 2. Pathology.
- 3. Forensic and Preventive Medicine.

Subjects of Group B are-

- 1. Surgery.
- 2. Ophthalmology.
- 3. Midwifery and Gynæcology.
- 0. 256. Only those candidates shall be eligible for University awards who pass at the main session of the First, Second and Third M.B., B.S. Examinations.

(34)—THE FIRST EXAMINATION FOR THE DEGREES OF M. B. B. S. (OLD RULES)

Admission

- **0. 257.** Candidates before presenting themselves for the First Examination shall produce certificates of having completely attended the following courses to the satisfaction of the Dean or Head of the College:—
 - (i) In Human Anatomy and Embryology:
 - (a) A complete course of lectures and demonstrations on Human Anatomy including Embryology, with special reference to their application to Medicine and Surgery, extending over five terms.
 - (b) A course of dissections of the entire cadaver extending over five terms. In this course the student must have dissected the whole cadaver to the satisfaction of his teacher.

- (ii) In Physiology:-
 - (a) A complete course of lectures and demonstrations on Physiology including Bio-Chemistry and Bio-Physics extending over five terms.
 - (b) A practical course of Histology, experimental Physiology and Bio-Chemistry (including Bio-Physics) extending over five terms.

They shall further produce certificates from the Dean or Head of the College, to the effect that they have gone through the course of Physical Training prescribed by the Syndicate from time to time, unless exempted on the ground that he is medically unfit to undergo such exercise, or that he is a member of the University Training Corps or that he has been regularly taking part as a member of the College Team in the recognised fixtures of matches of the major games.

In order to go through a course of Physical Training satisfactorily, the student shall have attended the Physical Training class of his College, for at least three-fourths of the possible number of periods.

Pailure to pass the examination will not debar the candidate from appearing at any subsequent examination on the submission of a new application, the payment of a fresh fee and the production of a certificate showing that he has, during the interval between the declaration of his failure and subsequent re-appearance at the examination, pursued a further course of study in the subjects of the examination to the satisfaction of the Dean or Head of a Medical College recognized by the University.

A candidate shall be deemed to have failed to pass an examination under the above Ordinance, if his name has been submitted by the Principal of his College for inclusion in the list of candidates appearing for the examination, and if the candidate has failed to pass the examination either because he has not attained the standard of passing or because he has been absent from the whole examination or from any part of it.

- R. 212. The subjects of the First M. B., B. S. Examination are:
 - (1) Anatomy including Embryology.
 - (2) Physiology including Histology, experimental Physiology and Bio-Chemistry.
- R. 213. The Examination shall consist of :—
 - (i) Human Anatomy including Embryology.
 - (a) Two written papers, each of three hours' duration, carrying 100 marks each.
 - (b) A practical and an oral test carrying 200 marks.

- (ii) Physiology including Experimental Physiology, Histology and Bio-Chemistry.
 - (a) Two written papers each of three hours' duration, carrying 100 marks each.

(N. B.: Each written paper shall be divided into two equal sections. One of the four sections shall be devoted to Bio-Chemistry.)

(b) A practical examination in Histology, Experimental Physiology and Bio-Chemistry and an oral test carrying 200 marks.

Syllabus for Bio-Chemistry including (Bio-Physics).

I.—BIO-PHYSICS (Theoretical).

R. 214. The Gas Laws:—Boyle's Law. Gay Lussac's Law. Normal temperature and pressure. Avogadro's Theorem. The general gas equation. Diffusion of gases and the Kinetic Theory. Deviation from Boyle's Law.

The Laws of solution:—Water as a solvent.—Solubility of gases.—Henry's Law. Solubility of gases in aqueous solutions. Solubility of liquids. Solubility of solids. Electrolytic and non-electrolytic solutions.

Surface Tension:—Determination of surface tension—formation of emulsions. Reversal of emulsions. Surface tension of aqueous solutions. Practical applications. Gibbs Thomson Theorem.

Viscosity:-Its measurement. Viscosity of the blood.

Diffusion and Osmotic Pressure:—Measurement of Osmotic pressure. Mode of action of semi-permeable membranes. Indirect measurement of Osmotic Pressure. Osmotic Pressure in the living organism.

The behaviour of electrolytes in solution:—The theory of electrolytic dissociation. Theory of ionisation and electrolysis. Conductivity of solutions. The mobilities of ions. Bio-Chemical action of ions.

The Law of Mass Action:—Balanced and reversible reactions. Its applications. Hydrion:—Determination of the concentration of Hydrion:—

(1) Electrometric method; (2) Indicator method—Buffer solutions—Bacteriological applications.

The colloidal State:—Crystalloids and Colloids—Suspensoids and emulsoids—The Ultra-microscope—Brownian movement—Formation of gels—Imbibition. Adsorption of a solid from a solution—Adsorption saturation—Some examples of adsorption—Electrostatic adsorption—Some biological applications. The Permeability of the Cell Membrane:—

Changes in the permeability. Nature of the Cell Membrane. The Compound Microscope and Polarimetry.

Electricity and Magnetism: Cells—Galvanism and Faradism—Construction and uses of string galvanometer and capillary electrometer—Du Bois Raymond's induction coil—Rheocord—Pohl's Commutator—Thermo-electricity.

II.—BIO-PHYSICS (Demonstrations).

Experiments illustrating the important practical applications of the following phenomena to Physiological processes:—

Filtration, Diffusion, Surface tension, Viscosity, Osmosis, Behaviour of electrolytes in solution, Law of mass action, H ion Concentration, Enzyme action and Catalysis, Colloidal state, Adsorption, Permeability of Cell membrane, Polarimetry and Thermoelectricity.

III .- BIO-CHEMISTRY.

(Practical work and Demonstrations.)

- Detection of the following elements:—
 Carbon, Hydrogen, Nitrogen, Sulphur, Phosphorous, Iron, Halogens.
- (2) Exercises involving crystallization, distillation, extraction with solvents, and determination of melting and boiling points.
- (3) Fats and Fatty acids—Physical properties of fats, preparation of fatty acid from a fat, saponification of fats, determination of molecular weight of a fatty acid by titration. Determination of unsaponified matter. (Demonstration).
 - (4) Proteins.
 - Their definition, classification, general reactions, colour reactions. Heat coagulation of Albumins and globulins. The Chemistry of egg white, Metaproteins, Albumins and Peptones. Glucoproteins, Reactions of certain Albuminoids, e. g. Gelatine and Keratin.
 - (5) Nucleoprotein, Nucleins and Nucleic acid (Demonstrations.)
 - (6) The preparation and properties of Amino-acids (Demonstrations.)
 - (7) The Carbohydrates.
 - The Monosaccharides, Disaccharides, Polysaccharides, Quantitative estimation of carbohydrates. Optical activity and the asymmetric Carbon Atom (Demonstration).
 - (8) The Chemistry of some foods:—
 Milk, Flour, Bread and Meat (Muscle).
 - (9) The composition of the digestive juices:—
 - (a) Saliva,
 - (b) Gastric Juice.

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The actions of enzymes :-

Ptyalin, Pepsin, Rennin, Lipase, Trypsin (Demonstration) Amylopsin (Demonstration), Schardinger's enzyme in milk (Demonstration), Peroxidase and Catalase (Demonstration) Autolysis (Demonstration.)

- (10) The cogulation of blood (Demonstration.)
- (11) The red blood corpuscles and the blood pigments:—
 The lacking of blood. Haemoglobin and its derivatives.
 Spectroscopy of blood pigments.
- (12) The constituents of Bile.
- (13) The Urine and its constituents.

The average composition. Physical Chemistry of Urine. The pigments of urine. The inorganic constituents, Urea. Uric Acid. Purin. Bases other than Uric acid. Creatnine and creatine. Ammonia.

Hippuric acid.

Certain constituents of abnormal urine, e. g. Albumin and Globulin. Albumoses. Bence-Jone's Protein. Blood pigments, Bile, Glucose, Pentose, Lactose, Acetone bodies, Glycuronic acid.

Urinary sediments.

(14) Quantitative analysis of urine.

Total nitrogen, Ammonia, Ammonia and Amino acids, Urea. Creatinine and creatine (Demonstration), Uric acid, Glucose, Acetone Bodies (Demonstration), Chlorides, Phosphates, Sulphates (Demonstration), Albumin, Diastase.

- (15) The analysis of blood.
 Glucose, Urea, Cholesterol, Calcium and blood gases
 (Demonstration.)
- (16) Detection of substances of Physiological interest:
 - (a) Fluids.
 - (b) Solids.

R. 215.) R. 216.)

Regulations 215 and 216 have been deleted.

Standard for Passing the Examination.

R. 217. To pass the examination the candidate shall obtain in each subject 50 per cent. of the full marks in the practical test, 40 per cent. in the written test, and 50 percent. in the written and practical tests taken together.

R. 218. A candidate who obtains 50 per cent. of the full marks in the practical test in either Anatomy or Physiology, 40 per cent. in the written test and 60 per cent. in the written and practical tests taken together, may, at his option, be excused from appearing in that subject at a subsequent examination. But he shall not be declared to

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have passed the whole examination until he has passed in both the subjects of the examination.

- R. 219. The subject or subjects in which any successful candidate may have distinguished himself will be shown on the list. In order to obtain distinction in any subject the student should pass the examination at the first attempt in all the subjects and obtain 75 per cent. of the full marks in the subjects.
- R. 220. Only those candidates who have passed the whole examination at one time will be eligible for marks of distinction or for any prize or scholarship to be awarded at the examination.

(35).—THE SECOND EXAMINATION FOR THE DEGREES OF M.B.,B.S. (OLD RULES)

Admission.

- 0. 259. No candidate shall be admitted to the Second M.B.,B.S. Examination unless he has passed the First M.B.,B.S. Examination and shall have been engaged in medical studies at a Medical College recognized by this University and completed satisfactorily at least three terms after passing that examination.
- **0. 260.** Before admission to the Second Examination each candidate shall present certificates of satisfactory attendance on the following courses to the satisfaction of the Dean or Head of the College:—

In Pharmacology and Materia Medica-

A course of lectures and demonstrations extending over twoterms.

In Practical Pharmacy—

A couse of demonstrations and practical work extending over one term.

O. 261. Failure to pass the examination will not debar the candidate from appearing at any subsequent examination on the submission of a new application, the payment of a fresh fee and the production of a certificate showing that he has, during the interval between the declaration of his failure and subsequent re-appearance at the examination, pursued a further course of study in the subjects of the examination to the satisfaction of the Dean or Head of a Medical College recognized by the University.

A candidate shall be deemed to have failed to pass an examination under the above Ordinance, if his name has been submitted by the Principal of his College for inclusion in the list of candidates for the examination, and if the candidate has failed to pass the examination either because he has not attained the standard or because he has been absent from the whole examination or from any part of it.

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- R. 221. Candidates shall be examined in the following subjects:—
 Pharmacology, Materia Medica and Practical Pharmacy.
- R. 222. The examination shall consist of—
 - (a) One written paper of three hours' duration, carrying 100 marks.
 - (b) A practical examination in Pharmacy as well as a practical or an oral test or both in Pharmacology, carrying 100 marks.

Syllabus.

R. 223.

PHARMACOLOGY AND MATERIA MEDICA.

- (A) Pharmacology.—A course consisting of—
 - (a) The Pharmacological action of drugs and other medicinal agents upon the lower organisms and the chief functions of the animal body, viz., Blood Formation; Circulation; Respiration; Digestion and Absorption; Secretion and Excretion; Metabolism; Heat Regulation; Motor, Sensory and reflex mechanisms;
 - (b) Distribution and changes undergone in the body by the principal medicinal substances;
 - (c) Chemical characters of drugs, in so far as they are of Pharmacological importance, especially, of the following:—
 Opium, Atropine, Cocaine and newer local anæsthetics, Strychnine, Caffeine, Hypnotics, Antipyretics, Salicine, Salicylates, Volatile oils and Fixed oils, Heavy metals, Tannin, and Arsenic;
 - (d) Physical properties of drugs in so far as they are of practical importance in medicine.

Note.—The candidates will not be expected to study all the drugs and their preparations in the B. P. but only those, at present, in common use. Pharmaceutical details as to the modes of preparations of drugs will not form a part of the examination.

(B) Pharmacy.—Prescriptions—reading, construction, and incompatibilities.

Posology of pharmacopaeial preparations. Weights and measures including the metric system. Dispensing.

Note.—The students should keep a record of all the practical work done by them in their class in Pharmacy and this record should be shown to the Examiners at the time of the University Examination.

(C) List of drugs and preparations to be identified by the candidates.

Æther Æthylis Chloridum Aloe Aloinum

Ammonii Caabonas Amylis Nitris Argenti Nitras Arseni Triiodidum (arsenious iodide) Asafoetida Bulbus Scillæ (Scilla) Kino Calx Chlorinata Camphora Cantharis Cannabis (Indica) Carbo Ligni Catechu Chloroformum Chloralis Hydras Capaiba (balsam) Cortex Cascaræ sagradæ Cinchon. rubr. (Cinchona) Cormus Colchici Creosotum Cupri Sulphas Ergota Ferri Carbonas Saccharatus " et ammonii citras " Sulphas Ferrum redactum (reduced iron) Filix Mas (Male fern) Folia Buchu " Digitalis " Sennœ Fructus Sennæ

Cubebæ

Glycerinum

Gummi Acaciæ Hydrargyrum (Mercury) Hydrargyri Oxidum Flavum Iodidum Rubrum Iodoformum Jalapa Lignum Quassice Menthol Myrrha Neoarsphenamina (Neosal varsan) Nux Vomica Oleum Menth. pip. Morrhuæ (Codliver oil) Oleum Ricini (Castor oil) Santali (Sandal wood oil) Terebinthinæ Opium Paraldehydum Paraffinum molle (vaselin) Phenol (Carbolic acid) Pot. Permanganas Pulpa Colocynthidis Radix Aconiti (Aconitum) Radix Ipecacuanhæ " Rhei Semina Strophanthi Colchici Spirit. Ammon. Aromat Rectificat. Etheris Nitrosi Tragacantha

Standard for Passing the Examination.

Thymol

R. 224. To pass the examination the candidate shall obtain 50 per cent. of the full marks in the practical or oral test, 40 per cent. in the written test and 50 per cent. in the written and the oral tests taken together.

R. 225. A special mark will be placed against the names of those candidates who have distinguished themselves in the examination. In order to obtain distinction, the student should pass the examination at the first attempt and obtain 75 per cent. of the full marks in the subject.

(36).—THE THIRD EXAMINATION FOR THE DEGRESS OF M. B., B. S. (OLD RULES)

Admission.

0. 262. No candidate shall be admitted to the Third M. B., B. S. Examination unless he has passed the Second M. B., B. S. Examination and

Chap. XXXIV] THIRD M. B., B. S. (OLD RULES): ADMISSION

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shall have been engaged in medical studies at a Medical College recognized by this University for at least one clear term after passing the Second M.B., B. S. Examination and for at least nine terms (three years) after passing the First M.B., B. S. Examination.

*0. 263.

Before admission to the Third M. B., B. S. Examination, each candidate shall present certificates of having satisfactorily attended the following courses to the satisfaction of the Dean or the Head of the College:—

i. In Medicine-

- (a) A course of lectures and clinical demonstrations in Medicine including Diseases of Children and Therapeutics extending over six terms.
- (b) An appointment of six months as a Clinical Clerk in the medical wards of a recognized hospital.
- (c) An appointment for three months as a Clinical Clerk in the medical out-patient department of a recognized hospital.
 - The course of instruction in Medicine shall include the practice of Clinical Pathology and laboratory methods and the application of Physiology and Anatomy to the investigation of diseases.
- (d) Every candidate shall also present evidence of having received instruction in the following subjects:—
 - (i) Fevers. (This course must be taken at a recognized Infectious Diseases Hospital for a period of three months.)

(ii) Tuberculosis.

(iii) Mental Diseases. (This course must be taken at a recognized Mental Hospital and shall consist of not less than 10 lectures and demonstrations.)

(iv) Dermatology.

(v) Practical instruction in Vaccination from one of the authorised Vaccinators.

ii. In Surgery-

- (a) A course of lectures and clinical demonstrations extending over six terms.
- (b) A course of practical instruction in Operative Surgery including operations on the cadaver to be performed by the students themselves, extending over a period of two terms.
- (c) An appointment for six months as Surgical Dresser in the wards of a recognized hospital.
- (d) An appointment for three months as Surgical Dresser in the out-patient department of a recognized hospital.

^{*} The appointments mentioned in Sub-clauses (b) and (c) under the head (i) Medicine above, and (c) and (d) under the head (ii) Surgery above, may be concurrent.

The course of instruction in Surgery shall include instruction in Surgical Pathology and the application of Physiology and Anatomy to the investigation of diseases.

Every candidate shall also present evidence of having received adequate instruction in the following

subjects:

- (i) Administration of Anæsthetics. (Each candidate shall be certified to have administered anæsthetics on, at least, ten occasions.)
- (ii) Dental Surgery.

(iii) Radiology.

(iv) Venereal Diseases.

(v) Diseases of Ear, Nose and Throat.

iii. In Midwifery and Diseases of Women-

(a) A course of lectures and clinical demonstrations extending over four terms.

(b) An appointment for six months as a Clinical Clerk in Maternity and Gynæcological wards, during which period he must have conducted twenty labour cases in a recognized Maternity Hospital or in the lying-in-wards of a General Hospital under the supervision of a qualified member of the medical staff; he shall have also attended during this period Gynæcological out-patients and ante-natal clinic at recognized institutions.

iv. In Ophthalmology—

- (a) A course of lectures and clinical demonstrations extending over one term.
- (b) An attendance for three months in the Ophthalmic outpatient department and wards of a recognized hospital.

v. In Pathology-

(a) A course of lectures, demonstrations and practical work in Pathology extending over two terms.

(b) A course of lectures, demonstrations and practical work in Bacteriology and Elementary Parasitology extending over two terms.

(c) A certificate of attendance as a post-morten clerk for one term.

The candidates will be required to submit to the Examiners full records of ten autopsis which they have attended and which have been certified by the teachers in that subject.

vi. In Forensic Medicine-

A course of instruction in Forensic Medicine and Toxicology including demonstrations extending over two terms.

vii. In Preventive Medicine-

A course of instruction in Preventive Medicine including demonstrations extending over one term.

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O. 263A.

Failure to pass the examination in either group will not debar the candidate from appearing at any subsequent examination on the submission of a new application, the payment of a fresh fee and the production of a certificate showing that he has, during the interval between the declaration of his failure and subsequent re-appearance at the examination, pursued a further course of study in the subject in which he wishes to present himself for the examination for the time being to the satisfaction of the Dean or Head of a Medical College recognized by the University.

A candidate shall be deemed to fail to pass the examination under the above Ordinance if his name has been submitted by the Principal of his College for inclusion in the list of candidates for the examination and if the candidate has failed to pass the examination either because he has not attained the standard of passing or because he has been absent from the whole examination or from any part of it.

Explanation:—The expression 'Course of study' in the above Ordinance shall not be deemed to include 'systematic lectures.'

R. 226.

Regulation 226 has been deleted.

R. 227.

The subjects in which the candidates will be examined are divided into two groups which may be taken together or separately.

Group A-

1. Medicine-

The examination in Medicine shall consist of :-

- (a) Two papers each of three hours' duration, carrying 100 marks each.
- (b) A clinical examination in Medicine carrying 100 marks, consisting of the following:—
 - (i) An examination of a patient and written report thereon for which one hour and a half will be allowed.
 - (ii) A short examination on one or more cases.
- (c) A practical and oral examination, carrying 100 marks.

2. Pathology-

The examination in Pathology shall consist of :-

(a) One paper of three hours' duration, carrying 100 marks.

(b) A practical examination, carrying 50 marks.

(c) An oral examination, carrying 50 marks.

3. Forensic and Preventive Medicine-

The examination in Forensic and Preventive medicine shall consist of :—

- (a) A paper of three hours' duration, carrying 100 marks divided into two sections.
 - (i) Forensic Medicine.
 (ii) Preventive Medicine.

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- (b) An oral examination in Forensic Medicine, carrying 50 marks.
- (c) An oral examination in Preventive Medicine, carrying 50 marks.

Group B-

1. Surgery-

The examinations in Surgery shall consist of :-

- (a) Two papers, each of three hours' duration, carrying 100 marks each.
- (b) A clinical examination, carrying 100 marks.
- (c) A practical and oral examination bearing on Surgical Anatomy, Pathology and appliances and operations on the cadaver, carrying 100 marks.

2. Ophthalmology.

The examination in Ophthalmology shall consist of :-

- (a) A paper of three hours' duration, carrying 100 marks.
 (b) A clinical and oral examination, carrying 100 marks.
- 3. Midwifery and Gynaecology.

The examination in Midwifery and Gynæcology shall consist of :-

(a) A paper of three hours' duration, carrying 100 marks.

(b) A clinical examination, carrying 50 marks.

(c) A practical and oral examination, carrying 50 marks.

R. 228. [Deleted.]

Syllabus.

R. 229.

FORENSIC MEDICINE.

Criminal Procedure,
Evidence,
Identification, Systems of determination of age,
Signs of death,
Modes of death,
Post-mortem examination for medico-legal purposes,
Sudden death from natural causes,
Wounds, medico-legal aspect of,
Wounds, examination of, for medico-legal purposes.
Wounds, Suicidal, Accidental or Homicidal,
Death from—
Asphyxia,
Starvation and cold,
Heat, Dry and Moist.

Lightning and Electricity,

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Virginity, Pregnancy, Delivery, Legitimacy, Impotence, Sterility, Abortion—Criminal,

Infanticide,

Rape, etc.

Examination of Blood Stains, Seminal Stains and Hairs.

Poison-Definition of a.

Modes of action of poisons,

Modifications of actions of poisons,

Evidence of poisoning,

Classification of poisons,

Poisons-I. Organic,

II. Inorganic.

Symptoms and signs of poisoning in the Living and in the Dead, Treatment of poisoning.

Post-mortem examination in cases of poisoning,

Differential diagnosis of poisoning,

Duty of the medical man in cases of poisoning,

Attendance at, at least, 12 medico-legal post-mortem examinations.

R. 230.

PREVENTIVE MEDICINE

I.—The health of man.—The Principles of personal hygiene as regards exercise, rest and sleep, habits, cleanliness and clothing. The nature, origin and purpose of food. Animal and vegetable foodstuffs. Vegetarianism. Beverages, stimulants and condiments. Diseases attributed to excess or deficiency of food and to various foodstuffs. The principles of diets and dieting.

II.—The health of man's dwelling.—Selection of building sites and the principles regulating the sanitary construction, ventilation, warming and cooling of dwellings. Impurities in air, general effects of vitiated air on respiration and diseases produced by impurities in the air.

III. The health of the city.—Sources of water-supply. The collection, distribution and storage of water including materials used for these purposes. The purification of water without filtration and with filtration. Filter beds and domestic filters. The collection and forwarding of water sample for chemical and bacteriological analysis. Sewage. Sewage removed by the water-carriage system and by dry methods. The disposal of sewage, cesspools, discharge into rivers or sea, chemical treatment, land treatment, and biological treatment. The collection and disposal of refuse.

IV.—The health of the community.—Infective diseases, their causes and prevention. Vaccination, isolation, segregation and quarantine. Deodorants, antiseptics and disinfectants and the methods of employing disinfectants. Diseases of occupation. Legal obligations of medical practitioners under public health regulations. Maternity and child welfare and school hygiene.

V.—The elements of vital statistics.—Calculation of population, birth and death rates. Causes and prevention of infant mortality.

VI.—Meteorology and climatology.—Atmospheric pressure, temperature and humidity. Barometers, hygrometers, thermometers, animometers, and the rain-gauge.

R. 231.

MENTAL DISEASES.

Normal Psychology; Sensation, Perception, Idea, Attention, Affection, Emotion, Conation, Instinct, Habit, Reflex action.

Association of Ideas, Memory, Judgment and Reasoning, Belief, Reaction, Time.

Causation of Insanity-Classification, general Symptomology.

Illusions—Hallucinations—Delusions—Abnormal. Habits—Impulsive Acts—Fatigue—Jealousy.

Mania, Melancholia, Manic-Depressive Insanity, Paronia, Stupor Dementia Praccox, Epochal Insanities. Puerperal, Climateric, Senile Intoxication—Psychosis—Alcoholism—Morphinism—-Cocainism—General Paralysis of the insane—Acute Hallucinatory Psychosis—Epilepsy—Psychosthenia—Idiocy and Imbecility.

Feigned Insanity.

Relationship of Insanity with law.

Standard of Passing the Examination.

R. 232.

To pass the examination the candidate shall obtain in each subject 50 per cent, of the full marks in the clinical, practical and oral tests, 40 per cent. in the written and 50 per cent. in the written and the clinical, practical and oral taken together. But he shall not be declared to have passed the whole examination until he has passed in all the subjects of the examination.

*R. 233.

A candidate who has appeared for the Third M. B., B. S. Examination either in part, or whole, shall be exempted at his option from appearing in the subject or subjects in which he has passed, and he may complete the said examination at a subsequent session or sessions by appearing in the subject or subjects in which he has failed, provided, however, that he passes in all the subjects within a period of two calendar years, or in four consecutive examinations including the first appearance. At the expiry of the period of two years or four consecutive examinations mentioned herein, the candidate will have a further chance of earning fresh exemptions from the date of his appearance at the examination after the expiry of the said period of two years or the said four consecutive examinations, whichever is longer, and the same rule regarding exemptions, shall apply to such further period or periods, the candidate being entitled to take the benefit of the rule in a similar manner at the expiry of each subsequent period of two years or four consecutive examinations. A candidate who does not avail himself of any exemption must also complete

*The amended Regulation, will apply to the Third M.B., B.S. Examination to be held in December 1938 and subsequent years. The exemptions earned by candidates under the old regulations with 60 per cent marks in a subject or subjects will not to be nullified.

Chap. XXXIV] M. B., B. S.: TRANSITORY PROVISIONS

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the examination within a period of two years from the date of his first appearance or within each subsequent period of two years as mentioned above. Non-appearance at an examination during any of the aforesaid period of two years shall be deemed as a failure to pass the examination for the purpose of this regulation.

R. 234.

The subject or subjects in which any successful candidate may have distinguished himself will be shown on the list. In order to obtain distinction in any subject the candidate should pass the examination at the first attempt in all the subjects, and obtain 75 per cent. of the full marks in the subject.

R. 235.

Only those candidates who have passed the whole examination at one time will be eligible for distinction or for any prize or scholarship to be awarded at the examination.

TRANSITORY PROVISIONS.

1. A candidate admitted to the Intermediate Class of a Medical College in or before June 1923 shall only be required to complete the courses of study laid down in the "old regulations"; Provided he shall have completed to the satisfaction of the Head of the Medical College the courses as therein laid down, he shall be eligible to sit for the Intermediate Examination after two years, and when successful at that examination, be eligible to sit for the final examination after a further two years; and should no examination under the old regulations be held at the time at which he would be eligible to sit, he shall be permitted to appear for the corresponding examination under the new regulations without completing any further terms or any additional courses of study and with any exemptions previously earned.

2. For the purpose of this rule—

The First Examination for the M. B., B. S. Degrees under the new regulations will be held to correspond with the Intermediate Examination under the old regulations except as regards Materia Medica, Pharmacology and practical Pharmacy; and furthermore, any candidate who shall have passed the Intermediate Examination under the old regulations, or shall have been exempted from sitting again there in Materia Medica, Pharmacology and Practical Pharmacy, shall be exempted from sitting in or keeping terms in those subjects at any subsequent examination conducted by the University; and any candidate who shall have passed the Intermediate Examination under the old regulations in Anatomy and Physiology but shall have failed in Materia Medica, Pharmacology and Practical Pharmacy, shall be eligible to keep terms for the Final (Third) M. B., B. S. Examination and shall be eligible, without keeping any further terms in these subjects, to sit for the Second Examination for the Degrees of M. B., B. S.

- (ii) Groups A and B of the Third M. B., B. S. Examination taken simultaneously shall together be held to correspond to the Final M. B., B. S., Parts I and II.
- 3. Students who have passed in Part I Final M. B., B. S. Examination will be exempted from the Second M. B., B. S. Examination in Materia Medica, Pharmacology and Practical Pharmacy, and in the subjects of Pathology, Forensic and Preventive Medicine of Group A of the Third M. B., B. S. Examination.
- 4. Any exemptions earned in any subject or subjects under the old regulations will hold good.
- 5. Students who have passed under the Regulations of 1923 in all the subjects which now constitute Group A of the Third M.B., B.S. Examination shall be deemed to have passed in Group A of the Third M.B., B.S. Examination held under the present regulations.
- 6. Candidates who have passed in the subjects of Surgery (including Ophthalmology) and Midwifery and Gynæcology at the Final M.B., B.S. Examination (Part II) held in April 1931, shall be excused from reappearing in Group B of the Third M. B., B.S. Examination (New Regulations) in the subjects of Midwifery and Surgery.
- 7. A candidate admitted to the Intermediate class of a Medical College in or before June, 1923, under the Old Regulations, who has satisfactorily completed the course of studies laid down in these regulations, and has passed in all the subjects which now constitute Group A of the Third M. B., B. S. Examination shall be deemed to have passed this group under the existing regulations.
- 8. If such a candidate has passed in all the subjects which now constitute Group B of the Third M. B., B. S. Examination, he shall be deemed to have passed this group under the existing regulations.
- 9. Candidates who, having passed Part I of the Final M.B., B.S. Examination according to 1923 Regulations, appear in the remaining subject of the Group 'A' and the whole of Group 'B' of the Third M.B., B.S. Examination according to 1928 Regulations at the same time and pass in all subjects but one, will be exempted from a future examination in subjects in which they have passed.
- 10. A candidate admitted to a Medical College under either the old or the 1923 Regulations, who has passed in all the subjects of the Third M. B., B. S. Examination except Ophthalmology according to 1928 Regulations shall be required to pass in Ophthalmology alone at a future examination before being declared to have passed the whole Third M. B., B. S. examination.

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M.B.B.S.

(Revised Regulations.)

GENERAL

*0. 253A.

Candidates for the Degrees of M.B., B.S. for being eligible for admission to a medical college affiliated to this University—

(i) must have attained the age of 17 years or will attain that age during that first term of the curriculum and

- (ii) must have passed an examination in Mathematics at least of the Matriculation standard of a Statutory Indian University and must further have passed the Intermediate Examination in Science of this University with Biology as their optional subject, or an equivalent examination of another recognized University in the subjects of Physics, Chemistry and Biology. The subject of Chemistry should include Organic Chemistry both theoretical and practical as a part of the syllabus for the said examination.
- 0. 254A.

The academic year for medical students shall consist of two terms, viz.:—

- (i) The first term commencing on the 10th June and ending on the 10th October, and
- (ii) the second term commencing on the 10th November and ending on the 10th April.
- 0. 255A.

Candidates for the degrees of M.B., B.S. shall be required to undergo a period of certified study extending over five academic years. After a period of study extending over two academic years in the subjects specified in O. 257, the candidates on the production of the necessary certificates would be entitled to appear for the First M.B., B.S. Examination. After passing the First M.B., B.S. Examination, candidates would be required to spend three years in a continuous study of the clinical group of subjects, and pass the Second M.B., B.S. Examination before being entitled to appear in the subjects for the Third M.B., B.S. Examination.

0. 256A.

Only those candidates shall be eligible for University awards who pass at the April session of the First, Second and Third M.B., B.S. Examinations.

N. B.—The Revised Ordinances and Regulations will apply to students prosecuting medical studies from June, 1938.

^{*} The Intermediate Examinations in Science of the following Universities and Boards in the groups of Physics, Chemistry and Biology have been recognized as equivalent to the Intermediate Examination in Science of this University in the same group for the purposes of the above Ordinance:

Benares Hindu University;

Benares Hindu University; Punjab University; Rajputana Board, Ajmer; Nagpur University; U. P. Board;

Delhi University.

Muslim University, Aligarh—(provided the student produces a certificate of eligibility for admission to the Punjab Medical College.)

(34A).—THE FIRST EXAMINATION FOR THE DEGREES OF M.B., B.S. (REVISED RULES)*

Admission

- 0. 257A. Candidates before presenting themselves for the First Examination shall produce certificates of:—
 - (A) having attended the following courses to the satisfaction of the Head of the College:—
 - (i) In Human Anatomy and Embryology:-
 - (a) A course of lectures and demonstrations on Human Anatomy including Embryology, with special reference to their application to Medicine and Surgery, extending over two years.
 - (b) A course of dissections, extending over two years. The candidates must have dissected the whole body to the satisfaction of their teachers.
 - (ii) Human Physiology :—
 - (a) A course of lectures and demonstrations on Physiology, including Bio-Chemistry and Bio-Physics, extending over two years.
 - (b) A practical course in Histology, Experimental-Physiology, Bio-Chemistry and Bio-Physics, extending over two years.
 - (iii) Normal Psychology:—
 - A course of instruction in Elementary Normal Psychology.
 - (iv) The normal reactions of the body to injury and infection, as an introduction to General Pathology and Bacteriology.†
 - (v) An introduction to Pharmacology.†
 - (vi) Elements of the methods of clinical examination, including the use of the common instruments and the examination of body fluids, with demonstrations on both normal and abnormal living subjects.†
 - N. B.—Courses in III, IV, V and VI above shall be attended in the second academic year.
 - (B) having passed a test in IV, V and VI above, conducted by the college.
 - (C) having undergone a course of Physical Training and attended at least three fourths of the possible number of periods in a physical training class of their college unless exempted

^{*}The first M.B., B.S. examination under the Revised Rules will be held for the first time in April 1940.

[†]The amount of time allotted to the study of these subjects shall not exceed three months.

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on medical grounds or on the ground of being a member of the University Training Corps or that he has been regularly taking part as a member of the college team in the recognized fixtures of matches of the major games.

O. 258A.

Failure to pass the examination will not debar candidates from appearing at any subsequent examination on the submission of a new application, the payment of a fresh fee and the production of certificates showing that they have, during the interval between the declaration of their failure and subsequent re-appearance at the examination, pursued a further course of study in the subjects of the examination to the satisfaction of the Head of a Medical College recognized by the University; provided, however, that candidates who fail to pass this examination on four occasions will not be eligible to reappear thereat.

Candidates shall be deemed to have failed to pass an examination under the above Ordinance, if their names have been submitted by the Principal of their College for inclusion in the list of candidates appearing for the examination, and if the candidates have failed to pass the examination either because they have not attained the standard of passing or because they have been absent from the whole examination or from any part of it.

- R. 212A. The subjects of the First M.B., B.S. Examination are:
 - (1) Human Anatomy including Embryology.
 - (2) Human Physiology including Histology, Experimental Physiology and Bio-Chemistry and Elementary Normal Psychology.
- R. 213A. The Examination shall consist of :-
 - (i) Human Anatomy including Embryology.
 - (a) Two written papers, each of three hours' duration, carrying 100 marks each.
 - (b) A practical and an oral test carrying 200 marks.
 - (ii) Physiology including Experimental Physiology, Histology Bio-Chemistry, Bio-Physics and Elementary Normal Psychology.
 - (a) Two written papers each of three hours' duration, carrying 100 marks each.
 - (N. B.—Each written paper shall be divided into two equal sections. One of the four sections shall be devoted to Bio-Chemistry and Bio-Physics, and in one of the remaining three sections, one of the questions shall pertain to Elementary Normal Psychology.)
 - (b) A practical examination in Histology, Experimental Physiology and Bio-Chemistry and an oral test carrying 200 marks.

Syllabus for Bio-Chemistry and Bio-Physics.

I.—BIO-CHEMISTRY

R. 214A.

(Practical work and Demonstrations.)

- (1) Detection of the following elements:—
 Carbon, Hydrogen, Nitrogen, Sulphur, Phosphorous, Iron,
 Halogens.
- (2) Exercises involving crystallization, distillation, extraction with solvents, and determination of melting and boiling points.
 - (3) Fats and Fatty acids.

Physical properties of fats, preparation of fatty acid from a fat, saponification of fats, determination of molecular weight of a fatty acid by titration. Determination of unsaponified matter. (Demonstration).

(4) Proteins.

Their definition, classification, general reactions, colour reactions. Heat coagulation of Albumins and globulins. The Chemistry of egg white, Metaproteins, Albumins and Peptones. Glucoproteins, Reactions of certain Albuminoids, e.g. Gelatine and Keratin.

- (5) Nucleoprotein, Nucleins and Nucleic acid (Demonstrations).
- (6) The preparation and properties of Amino-acids (Demonstrations).
 - (7) The Carbohydrates.

The Monosaccharides, Disaccharides, Polysaccharides, Quantitative estimation of carbohydrates. Optical activity and the asymmetric Carbon Atom (Demonstration).

- (8) The Chemistry of some foods:—
 Milk, Flour, Bread and Meat (Muscle).
- (9) The Composition of the digestive juices :-

(a) Saliva.

(b) Gastric Juice.

The actions of the following enzymes:—
Ptyalin, Pepsin, Rennin, Lipase, Trypsin (Demonstration), Amylopsin (Demonstration), Schardinger's enzyme in milk (Demonstration), Peroxidase and Catalase (Demonstration).

Autolysis (Demonstration).

- (10) The coagulation of blood (Demonstration).
- (11) The red blood corpuscles and the blood pigments:—
 The laking of blood. Haemoglobin and its derivatives. Spectroscopy of blood pigments.
- (12) The constituents of Bile.

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(13) The Urine and its constituents.

The average composition. Physical Chemistry of Urine. The pigments of urine. The inorganic constituents. Urea. Uric Acid. Purin. Bases, other than Uric acid. Creatinine and creatine. Ammonia.

Hippuric acid.

Certain constituents of abnormal urine, e. g., Albumin and Globulin. Albumoses. Bence-Jone's Protein. Blood pigments, Bile, Glucose, Pentose, Lactose, Acetone bodies, Glycuronic acid. Urinary sediments.

(14) Quantitive analysis of urine.

Total nitrogen, Ammonia. Ammonia and Amino acids, Urea, Creatinine and creatine (Demonstration,) Uric acid, Glucose, Acetone Bodies (Demonstration), Chlorides, Phosphates, Sulphates (Demonstration), Albumin, Diastase.

(15) The analysis of blood.

Glucose, Urea, Cholesterol, Calcium and blood gases (Demonstration).

- (16) Detection of substances of Physiological interest :-
 - (a) Fluids.
 - (b) Solids.

R. 215A.

I.—BIO-PHYSICS (Theoretical)

The Gas Laws:—Boyle's Law. Gay Lussac's Law. Normal temperature and pressure. Avogadro's Theorem. The general gas equation. Diffusion of gases and the Kinetic Theory. Deviation from Boyle's Law.

The Laws of Solution:—Water as a solvent.—Solubility of gases.—Henry's Law. Solubility of gases in aqueous solutions. Solubility of liquids. Solubility of solids. Electrolytic and non-electroytic solutions.

Surface Tension:—Determination of surface tension—formation of emulsions. Reversal of emulsions. Surface tension of aqueous solutions. Practical applications. Gibbs Thomson Theorem.

Viscosity :- Its measurement. Viscosity of the blood.

Diffusion and Osmotic Pressure:—Measurement of Osmotic pressure. Mode of action of semi-permeable membranes. Indirect measurement of Osmotic Pressure. Osmotic Pressure in the living organism.

The behaviour of electrolytes in Solution:—The theory of electrolytic dissociation. Theory of ionisation and electrolysis. Conductivity of solutions. The mobilities of ions. Bio-Chemical action of ions.

The Law of Mass Action:—Its applications. Balanced and reversible reactions. Hydrion:—Determination of the concentration of Hydrion:—(1) Electrometic method; (2) Indicator method—Buffer solutions—Bacteriological applications.

The colloidal State:—Crystalloids and Colloids—Suspensoids and emulsoids—The Ultra-microscope—Brownian movement—Formation of gels—Imbibition. Adsorption of a solid from a solution—Adsorption saturation—Some examples of adsorption—Electrostatic adsorption—Some biological applications. The Permeability of the Cell Membrane:—

Changes in the permeability. Nature of the Cell Membrane.

The Compound Microscope and Polarimetry.

Electricity and Magnetism: Cells—Galvanism and Faradism—Constructions and uses of string galvanometer and capillary electrometer—Du Bois Raymond's induction coil—Rheocord—Pohl's Commutator—Thermo-electricity.

R. 216A.

III.—BIO-PHYSICS (Demonstrations)

Experiments illustrating the important practical applications of the following phenomena to physiological processes:—

Filtration, Diffusion, surface tension, Viscosity, Osmosis, Behaviour of electrolytes in solution, Law of mass action, H ion Concentration, Enzyme action and Catalysis, Colloidal state, Adsorption, Permeability of Cell membrane, Polarimetry and Thermoelectricity.

Standard for Passing the Examination

- R. 217A. To pass the examination the candidates shall obtain in each subject 50 per cent. of the full marks in the practical test, 40 per cent. in the written test and 50 per cent. in the written and practical tests taken together.
- R. 218A. Candidates who obtain 50 per cent. of the full marks in the practical test in either Anatomy or Physiology, 40 per cent. in the written test and 60 per cent. in the written and practical tests taken together, may, at their option, be excused from appearing in that subject at a subsequent examination. But they shall not be declared to have passed the whole examination until they have passed in both the subjects of the examination.
 - R. 219A. The subject or subjects in which successful candidates may have distinguished themselves will be shown on the list. In order to obtain distinction in any subject, the candidates should pass the examination at the first attempt in all the subjects, and obtain 75 per cent. of the full marks in the subjects.
 - R. 220A. Only those candidates who have passed the whole examination at one time will be eligible for marks of distinction or for any prize or scholarship to be awarded at the examination.

Chap. XXXIV] SECOND M.B., B.S. (REVISED RULES): ADMISSION

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(35A).—THE SECOND EXAMINATION FOR THE DEGREES OF M.B., B.S., (REVISED RULES.)*

0. 259A.

Admission.

No candidate shall be admitted to the Second M.B., B.S. Examination unless he has passed the First M.B., B.S. Examination and shall have been engaged in medical studies at a Medical College recognized by this University for a period of two years after passing that examination.

0. 260A.

Before admission to the Second Examination, candidates shall present certificates of having completely attended the following courses to the satisfaction of the Head of the College:—

In Pharmacology, including Elementary Pharmacological Chemistry and Materia Medica—

A course of lectures and demonstrations, extending over two terms.

In practical Pharmacy-

A course of demonstrations and practical work extending over one term.

0. 261A.

Failure to pass the examination will not debar candidates from appearing at any subsequent examination on the submission of a new application, the payment of a fresh fee and the production of certificates showing that they have, during the interval between the declaration of their failure and subsequent re-appearance at the examination, pursued a further course of study in the subjects of the examination to the satisfaction of the Head of a Medical College recognized by the University.

Candidates shall be deemed to have failed to pass an examination under the above Ordinance, if their names have been submitted by the Principal of their College for inclusion in the list of candidates for the examination, and if the candidates have failed to pass the examination either because they have not attained the standard or because they have been absent from the whole examination or from any part of it.

R. 221A.

Candidates shall be examined in the following subjects:-

Pharmacology, Materia Medica and Practical Pharmacy.

R. 222A.

The examination shall consist of-

- (a) One written paper of three hours' duration, carrying 100 marks.
- (b) A practical examination in Pharmacy as well as a practical or an oral test or both in Pharmacology, carrying 100 marks.

^{*}The Second M.B., B.S. Examination under the Revised Rules will be held for the *first* time in April 1942.

Syllabus

PHARMACOLOGY AND MATERIA MEDICA

R. 223A.

- (A) Pharmacology.—A course consisting of-
- (a) The Pharmacological action of drugs and other medicinal agents upon the lower organisms and the chief functions of the animal body, viz., Blood Formation; Circulation; Respiration; Digestion and Absorption; Secretion and Excretion; Metabolism; Heat Regulation; Motor, Sensory and Reflex mechanisms;
- (b) Distribution and changes undergone in the body by the principal medicinal substances;
- (c) Chemical characters of drugs, in so far as they are of Pharmacological importance, especially, of the following:—
 - Opium, Atropine, Cocaine and newer local anæsthetics, Strychnine, Caffeine, Hypnotics, Antipyretics, Salicine, Salicylates, Volatile oils and Fixed oils, Heavy metals Tannin, and Arsenic;
- (d) Physical properties of drugs in so far as they are of practical importance in medicine,
 - (c) Therapeutic uses of drugs studied.
- Note.—Pharmaceutical details as to the modes of preparation of drugs will not form a part of the examination.
- (B) Pharmacy.—Prescriptions—reading, construction, and incompatibilities.

Posology of pharmacopaeial preparations.

Weights and measures including the metric system.

Dispensing.

- Note.—The candidates should keep a record of all the practical work done by them in their class in Pharmacy and this record should be shown to the Examiners at the time of the University Examination.
- (C) List of drugs and preparations to be identified by the candidates:—

Æther

Æthylis Chloridum

Aloe

Aloinum

Ammonii Caabonas

Amylis Nitris Argenti Nitras

Arseni Triiodidum (arsenious

iodide) Asafoetida

Bulbus Scillæ (scilla)

Calx Chlorinata

Camphora Cantharis

Cannabis (Indica)

Carbo Ligni Catechu

Chloroformum Chloralis Hydras

Capaiba (balsam) Cortex Cascarœ sagradœ

Cinchon. rubr. (Cinchona)

Cormus Colchici Creosotum Chap. XXXIV] THIRD M.B., B.S. (REVISED RULES): ADMISSION

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Cupri Sulphas Ergota

Ferri Carbonas Saccharatus

" et ammonii citras

" Sulphas Ferrum redactum (reduced iron)

Filix Mas (Male fern) Folia Buchu

" Digitalis " Sennœ Fructus Sennæ

, Cubebæ

Glycerinum Gummi Acaciæ

Hydrargyrum (Mercury)
Hydrargyri Oxidum Flavum
Iodidum Rubrum

Iodoformum Jalapa Kino Lignum Quassiœ

Menthol Myrrha Neoarsphenamina (Neosalvarsan)

Nux Vomica Oleum Menth. pip.

" Morrhuæ (Codliver oil) Oleum Ricini (Castor oil)

" Santali (Sandal wood oil)

" Terebinthinæ

Opium Paraldehydum

Paraffinum molle (vaselin)

Phenol (Carbolic acid) Pot. Permanganas

Pulpa Colocynthidis Radix Aconiti (Aconitum)

Radix Aconth (Aconthu Radix Ipecacuanhæ

" Rhei

Semina Strophanthi

Spirit. Ammon. Aromat

, Rectificat. Etheris Nitrosi

Tragacantha Thymol

Standard for Passing the Examination

R. 224A. To pass the examination the candidates shall obtain 50 per cent. of the full marks in the practical or oral test, 40 per cent. in the written test and 50 per cent. in the written and the oral tests taken together.

R. 225A. A special mark will be placed against the names of those candidates who have distinguished themselves in the examination. In order to obtain distinction, the candidates should pass the examination at the first attempt and obtain 75 per cent. of the full marks in the subject.

(36A.)—THE THIRD EXAMINATION FOR THE DEGREES OF M.B., B.S. (REVISED RULES).*

Admission.

No candidate shall be admitted to the Third M.B., B.S., Examination unless he has passed the Second M.B., B.S., Examination and shall have been engaged in medical studies at a Medical College recognized by this University for at least one clear term after passing the Second M.B., B.S. Examination and for at least three years after passing the First M.B., B.S. Examination.

^{*}The Third M. B., B. S. Examination under the Revised Rules will be held for the first time in April 1943.

*0. 263A.

Before admission to the Third M.B., B.S. Examination, candidates shall present certificates of having satisfactorily attended the following courses to the satisfaction of the Head of the College:-

I. In Medicine—

(a) A course of lectures and clinical demonstrations in Medicine including Diseases of Infancy and Childhood, extending over two years.

Note.—The course of instruction in Medicine shall include the practice of clinical Pathology and laboratory methods and the application of Physiology and Anatomy to the investigation of diseases.

- (b) A medical clinical clerkship for a period of nine months of which six months must be spent in the hospital wards and three months in the outpatient department.
- (c) A clinical clerkship for not less than one month in a children's ward or hospital, or in a children's outpatient department.

Note.—During the period of medical ward clerking candidates must have been in residence in hospital or close by for a continuous period of three months as intern clerks.

- (d) Instruction in Therapeutics and Prescribing, including (i) pharmacological therapeutics, (ii) the methods of treatment by vaccines and sera, (iii) physiotherapy, (iv) dietetics, and (v) the principles of nursing.
- (e) Every candidate shall also present evidence of having received instruction in the following subjects:-
 - Fevers. (This course must be taken at a recognized Infectious Diseases Hospital for a period of three months.)

Tuberculosis. (ii)

Psychopathology and Mental Diseases. (This course must (iii) be taken at a recognized Mental Hospital and shall consist of not less than 10 lectures and demonstrations).

Dermatology. (iv)

Practical instruction in Vaccination from one of the (v)authorised Vaccinators.

Radiology and Electro-therapeutics in their application to (vi) Medicine.

Note.—Throughout the whole period of instruction in Medicine, importance of the preventive aspects of the subject shall be emphasised.

II. In Surgery—

(a) A course of lectures and clinical demonstrations in Surgery including diseases of infancy and childhood, extending over two years.

Note.—The course of instruction in Surgery shall include instruction in Surgical Pathology and the application of Physiology and Anatomy to the investigation of diseases.

^{*} The appointments mentioned in Sub-clauses (b) and (c) under the head (i) Medicine above, and (b) and (d) under the head (ii) Surgery later, may be

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(b) A Surgical dressership for a period of nine months of which six months must be spent in the hospital wards and three months in the outpatient department.

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Note.—During the period of surgical ward dressing candidates must have been in residence in hospital or close by for a continuous period of three months as intern clerks.

- (c) A course of practical instruction in Operative Surgery, including operations on the cadaver to be performed by the students themselves, extending over a period of one term.
 - (d) Practical instruction in minor surgery on the living.
- (e) Practical instruction in Surgical methods, including Physiotherapy.
- (f) Every candidate shall also present evidence of having received adequate instruction in the following subjects:—
 - (i) Administration of Anæsthetics. (Candidates shall be required to produce a certificate of having administered Anæsthetics on, at least, ten occasions.)
 - (ii) Dental Surgery.
 - (iii) Radiology and Electro-therapeutics in their application to Surgery.
 - (iv) Venereal Diseases.
 - (v) Diseases of Ear, Nose and Throat including the use of the Otoscope, Laryngoscope and Rhinoscope.
 - (vi) Orthopaedics.

Note.—Throughout the whole period of instruction in Surgery, importance of the preventive aspects of the subject shall be emphasised.

III. In Midwifery and Diseases of Women-

- (a) A course of lectures and clinical demonstrations, extending over one year in Midwifery, Gynaecology and Hygiene of the new born. The course of instruction in Midwifery shall include Applied Anatomy and Physiology of pregnancy and labour.
- (b) An appointment for six months* as a Clinical Clerk in Maternity and Gynæcological wards, during which period candidates must have conducted twenty labour cases in a recognized Maternity Hospital or in the lying-in-wards of a General Hospital under the supervision of a qualified member of the medical staff; they shall have also attended during this period Gynæcological outpatients and antenatal clinic at recognized institutions.

Note 1.—During the period of clinical clerkship, candidates must have been in residence in hospital or close by for a continuous period of three months as intern clerks.

^{*}These shall be subsequent to the periods of medical clinical clerkship and surgical dressership spent in the wards.

Note 2.—A certificate showing the number of cases of labour conducted by the candidates in the Maternity hospital should be signed by a responsible Medical Officer on the Staff of the Hospital, and should state:—

(i) That the candidates have personally conducted all the certified cases during the course of labour, and have made the necessary abdominal and other examinations under

the supervision of the certifying officer.

(ii) That satisfactorily written histories of the cases attended by the candidates were presented to the supervising officer and countersigned by him.

(iii) That the candidates have attended the ante-natal out-patient department and have written out at least 20 cases in an ante-natal case book certified by a responsible medical officer on the staff of the hospital.

IV. In Ophthalmology-

- (a) A course of lectures and clinical demonstrations extending over one term.
- (b) An attendance for three months in the Ophthalmic out-patient department and wards of a recognized Hospital.

Note.—The course of instruction shall include a study of refraction and the use of the Ophthalmoscope.

V. In Pathology—

- (a) A course of lectures, demonstrations and practical work in Pathology, extending over two terms.
- (b) A course of lectures, demonstrations and practical work in Bacteriology and Elementary Parasitology, extending over two terms.
- (c) A course of instruction in Chemical Pathology and in Clinical Pathology and Bacteriology.
- (d) A certificate of having performed at least ten autopsis as a post mortem clerk.

The candidates will be required to submit to the examiners full records of ten autopsis which they have attended and which have been certified by the teachers in that subject.

*VI. In Forensic Medicine-

- (a) A course of instruction in Forensic Medicine and Toxicology including demonstrations extending over one term.
- (b) The candidates will be required to produce a certificate of having attended six medico-legal autopsis.

*VII. In Preventive Medicine-

A course of instruction in preventive Medicine including demonstrations, extending over one term.

^{*} Courses of instruction in these subjects should be given not earlier than the fourth year.

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O. 263AB.

Failure to pass the examination will not debar the candidates from appearing at any subsequent examination, on the submission of a new application, the payment of a fresh fee and the production of a certificate showing that they have, during the interval between the declaration of their failure and subsequent re-appearance at the examination, pursued a further course of study in the subjects in which they wish to present themselves for the examination for the time being, to the satisfaction of the Head of a Medical College recognized by the University.

Candidates shall be deemed to fail to pass the examination under the above Ordinance if their names have been submitted by the Principal of their College for inclusion in the list of candidates for the examination and if they have failed to pass the examination either because they have not attained the standard of passing or because they have been absent from the whole examination or from any part of it.

Explanation:—The expression 'Course of study' in the above Ordinance shall not be deemed to include 'systematic lectures'.

R. 226A.

Regulation 226 has been deleted.

R. 227A.

The subjects in which the candidates will be examined are as under:—

(1) Pathology and Bacteriology—

The examination in Pathology shall consist of :-

(a) One paper of three hours' duration, carrying 100 marks.

(b) A practical examination, carrying 50 marks.(c) An oral examination, carrying 50 marks.

(2) Forensic and Preventive Medicine—

The examination in Forensic and Preventive Medicine shall consist of :—

(a) A paper of three hours' duration, carrying 100 marks divided into two sections.

(i) Forensic Medicine.(ii) Preventive Medicine.each carrying equal marks.

- (b) An oral examination in Forensic Medicine carrying 50 marks.
- (c) An oral examination in Preventive Medicine carrying 50 marks.
- (3) Medicine-

The examination in Medicine shall consist of :-

- (a) Two papers each of three hours' duration, carrying 100 marks each.
- (b) A clinical examination in Medicine carrying 100 marks, consisting of the following:—

An examination of a patient and a written report

(ii) A short examination on not less than two cases.

- (c) A practical and oral examination, carrying 100 marks.
- (4) Surgery-

The examination in Surgery shall consist of :-

- (a) Two papers, each of three hours' duration, carrying 100 marks each.
- (b) A clinical examination, carrying 100 marks consisting of :-
 - (i) an examination of a patient and a written report thereon, and
 - (ii) a short examination on not less than two cases.
- (c) A practical and oral examination bearing on Surgical Anatomy, Pathology, use of surgical appliances and operations on the cadaver, carrying 100 marks.
- (5) Ophthalmology—

The examination in Ophthalmology shall consist of :-

- (a) A paper of three hours' duration, carrying 100 marks.
- (b) A clinical and oral examination, carrying 100 marks.
- (6) Medwifery and Gynaecology—

The examination in Midwifery and Gynæcology shall consist of :-

- (a) A paper of three hours' duration, carrying 100 marks.
- (b) A clinical examination, carrying 50 marks.
- (c) A practical and oral examination, carrying 50 marks.

R. 228A.

[Deleted.]

Syllabus

FORENSIC MEDICINE

R. 229A.

Criminal Procedure,
Evidence,
Identification, Systems of determination of age,
Signs of death,
Modes of death,
Post-mortem examination for medico-legal purposes,
Sudden death from natural causes,
Wounds, medico-legal aspect of,
Wounds, examination of, for medico-legal purposes,
Wounds Suicidal, Accidental or Homicidal.
Death from—
Asphyxia,
Starvation and cold,
Heat, Dry and Moist,

Lightning and Electricity.

Virginity, Pregnancy, Delivery, Legitimacy, Impotence, Sterility,

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Abortion—Criminal, Infanticide.

Rape, etc.

Examination of Blood Stains, Seminal Stains and Hairs.

Poison-Definition of a:-

Modes of action of poisons, Modifications of actions of poisons, Evidence of poisoning, Classification of poisons,

Poisons—I. Organic, II. Inorganic,

Symptoms and signs of poisoning in the Living and in the Dead, Treatment of poisoning,

Post-mortem examination in cases of poisoning, Differential diagnosis of poisoning, Duty of the medical man in cases of poisoning, Duty in relation to the State, Medical Ethics.

PREVENTIVE MEDICINE.

R. 230A.

Water.—Sources. Collection and storage. Rainfall. Upland surface waters. Streams and Rivers. Springs. Wells. Quantity required per head. Distribution. Purification and sterilization. Diseases produced by impure water. Collection forwarding of samples of water.

The Collection.—Removal and Disposal of excretal and other refuse: Removal and Disposal of Domestic dry refuse. Human excreta. Conservancy systems. Disposal of night-soil. House waste waters. Disposal of slop-waters. The water carriage system. House drainage arrangements. The testing of drains and soil pipes sewers. Inspection, ventilation. The disposal of sewage. The biological purification of sewage. Standards for effluents.

Air and Ventilation.—Atmospheric air, its composition. Vitiation of air. Effects of vitiated air; factors responsible for the ill-effects. Kata Thermometer. Ventilation. External. Ventilation of inhabited rooms. Natural and Artificial ventilation.

Warming and Lighting.—Radiation. Conduction. Convection. Systems of heating. Natural light. Artificial light.

Soils and Building Sites.—Features influencing climate and health. Made-soils. Selection of building sites and the principles regulating sanitary construction of dwelling. Prevention of dampness.

Climate and Meteorology.—Climate in relation to health. Classification of climates. Thermometers. Barometers, hygrometers, anemometers and raingauze.

Personal Hygiene.—Cleanliness, habit, clothing, exercise, rest and sleep.

Food and diets.—The nature and purpose of food. The proximate constituents of food. Standard dietaries. Vitamins. Diseases connected with food. Diet in India. Vegetable and animal food stuffs. Beverages, stimulants and condiments.

Rural Sanitation.—Water supply, disposal of refuse, conservancy, housing, protection against common diseases in villages.

Communicable diseases.—Infection—its nature and control. Immunity. Human "carriers" of disease. Insect "carriers" of disease.

The following infectious diseases are to be fully studied:—

Anthrax—Cerebro spinal fever—cholera—dengue. Diptheria-Influenza—Leprosy—Malaria. Measles—Plague—Rabies—Relapsing fever. Scarlet fever—small-pox—Tuberculosis—Typhoid. Typhus—Yellow fever—Kala-azar.

Disinfection.—Deoderants—antiseptics and disinfectants. The practical methods of employing disinfectants.

Elements of Vital Statistics—Calculation of population, birth and death rates and infant mortality. Causes and prevention of infant mortality. Maternity and child welfare.

MENTAL DISEASES.

R. 231A. Normal Psychology, Sensation, Perception, Idea, Attention, Affection, Emotion, Conation, Instinct, Habit, Reflex action.

Association of Ideas, Memory, Judgment and Reasoning, Belief, Reaction, Time.

Causation of Insanity-Classification, general Symptomology.

Illusions—Hallucinations—Delusions—Abnormal Habits—Impulsive Acts—Fatigue—Jealousy.

Mania, Melancholia, Manic-Depressive Insanity, Paronia, Stupor, Dementia, Præcox, Epochal Insanities. Puerperal, Climateric, Senile Intoxication——Psychosis——Alcoholism——Morphinism——Cocainism——General Paralysis of the insane—Acute Hallucinatory Psychosis——Epilepsy——Psychosthenia——Idiocy and Imbecility.

Feigned Insanity.

Relationship of Insanity with Law.

Standard of Passing the Examination

R. 232A. To pass the examination, the candidates shall obtain in each subject 50 per cent. of the full marks in the clinical, practical and oral test, 40 per cent. in the written and 50 per cent. in the written and the clinical, practical and oral tests taken together. But they shall

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not be declared to have passed the whole examination until they have passed in all the subjects of the examination.

R. 233A.

- (i) Candidates who have appeared for the Third M.B., B.S. Examination, either in part or whole, shall be exempted at their option from appearing in the subject or subjects in which they have passed, and they may complete the said examination at a subsequent session or sessions by appearing in the subject or subjects in which they have failed, provided, however, that they pass in all the subjects within a period of two calendar years, or in four consecutive examinations including first appearance.
- (ii) Candidates who do not avail themselves of any exemption must also complete the examination within a period of two years from the date of their first appearance.
- (iii) At the expiry of each period of two years or four successive examinations, another period of the same duration may follow during which the above rules (i) and (ii) will be applicable as regards exemptions and passing the examination.
- (iv) Non-appearance at an examination during any of the period of two years shall be deemed as a failure to pass the examination for the purpose of this regulation.

R. 234A.

The subject or subjects in which successful candidates may have distinguished themselves will be shown on the list. In order to obtain distinction in any subject, the candidates should pass the examination at the first attempt in all the subjects, and obtain 75 per cent. of the full marks in the subject.

R. 235A.

Only those candidates who have passed the whole examination at one time will be eligible for distinction or for any prize or scholarship to be awarded at the examination.

Transitory Regulations

(1) In view of the changes in the sub-division of the academical year for medical studies into two terms instead of three for students commencing their medical studies from June 1938, the following table of equivalence of terms shall apply to the attendance at courses of study prescribed for the M.B.,B.S. Examinations under the old Ordinances and Regulations:—

Table of Equivalence of Terms

Subject :	Old:	New:	
(a) Human Anatomy & Embryology & Physiology (b) Histology (c) Organic Chemistry	5 terms 3 terms 2 terms	2 academic years. 1 academic year. 1 term.	

Subject :		Old:		New:	
(d) (e) (f) (g) (h)	Pharmacology Practical Pharmacy Medicine Surgery: Lectures Optical Surgery Midwifery Ophthalmology Pathology: Lectures and Demonstrations etc Practical and Elementary	2 1 6 6 2 4 1	terms terms terms terms terms terms terms terms	1 2 2 1 1 1	academic years. academic years. term. academic year. term.
	Parasitology Post-Mortem	2	terms term	1	academic year. term.
(i)	Forensic & Preventive Medicine	2	terms	1	term.
(j)	Hygiene	1	term	1	term.

- (2) A candidate for the First M.B., B.S. Examination under the old Regulations who, after being unsuccessful at the Examination, seeks admission to the same examination under the new rules shall be exempted from study from such additional subjects as are prescribed under the Ordinances and Regulations, and in which a certificate of having satisfied the Head of the College has been submitted.
- (3) A candidate who having failed at the First M.B.,B.S. Examination under the old Regulations re-appears under the new Regulations shall not be required to answer questions in Normal Psychology, one of the additional subjects prescribed for the First M.B.,B.S. Examination under the new Regulations.
- (4) An exemption earned by a candidate in a subject at an examination held under the old Regulations shall continue in force at the examination held under the new Regulations, unless and until the candidate has waived such exemption by appearing for the examination under the new Regulations in that subject.
- (5) No separate examination shall be held under the old Regulations.

(37).—BACHELOR OF HYGIENE.*

Admission.

0. 264.

No candidate shall be admitted to this examination unless he has passed, not less than a year previously, the examination for the Degrees of Bachelor of Medicine and Surgery of this University, or of any University recognized by this University or taken the Degree of Licentiate of Medicine and Surgery of this University and unless he produces satisfactory testimonials to the effect—

^{*}The 'Diploma in Public Health' has been substituted for the existing degree of Bachelor of Hygiene.

That after passing any of the examinations mentioned above-

- (a) he has attended during a period of six months courses of Practical Laboratory* Instruction in (1) Chemistry, (2) Bacteriology, (3) Animal Parasitology (including the life-history of those animals concerned in the transmission of diseases to man) and (4) the Pathology of those diseases of animals that are transferable to man:
- (b) he has during six months (of which at least three months shall be distinct and separate from the period of the above Laboratory Instruction) been diligently engaged in acquiring a practical knowledge of the duties, routine and special, of Public Health Administration under the supervision of an approved Health Officer;†
- (c) he has attended during three months the practice of a Hospital for Infectious Diseases of at least 50 beds at which opportunities are afforded for the study of Clinical instruction in Infectious Diseases and methods of Administration.

R. 236.

The examination will be held in two parts, both of which may be passed at the same time or each separately, Part I first, and Part II afterwards. If any candidate taking both parts together passes in Part I or Part II, he will be exempted from that part of the examination in which he has passed.

Part I, which will consist of two papers and a Practical Examination in the Laboratory work and viva voce examination, will have reference to the general principles of Sanitary Science and will comprise the following:—

The elements of Chemistry, Physics and Geology, methods of chemical analysis, and in particular the analysis of air and water, including a knowledge of the interpretation of results. The laws of heat and the elements of pneumatics, hydrostatics and hydraulics, in their application to warming, ventilation, water-supply and drainage. The geological and other conditions determining the healthiness of sites for dwellings. storage, and purification of water-supply. The elements of Meteorology in relation to health, meteorological instruments, their construction and use. Principles of building construction application to dwellings, factories, The disposal of sewage and refuse and the and schools. general principles of Sanitary Engineering. The reading and interpretation of Geological and Ordinance Survey Maps.

^{*}The Laboratories recognized for the above course are—

i. Grant Medical College Laboratories.

ii. Seth Gordhandas Sunderdas Medical College Laboratories. iii. Bombay Municipal Laboratory (for chemical purposes only.)

The Laboratory instruction and practical knowledge of Public Health Administration given in any part of the United Kingdom and approved by the General Medical Council of Education will be accepted.

[†]The Health Officers approved at present are the Health Officers of Bombay, Calcutta and Madras. The Laboratory instruction and practical knowledge of Public Health Administration given in any part of the United Kingdom and approved by the General Medical Council of Education will be accepted.

EXAMINATIONS

Disinfectants, their chemical and bacteriological efficiency and use. Dietetics and the chemical and microscopical examination of foods, and the detection of the commoner forms of adulterations. The methods of bacteriological investigation and analysis. The bacteriology of air, water, food and soil. Animal parasitology and life-history and recognition of those animals concerned in the transmission of diseases to man. The general pathology of infection and of the diseases of animals that are transmissible to man. Nature of immunity and protection from infectious diseases.

Part II, which will consist of two papers and a Practical Examination in, and reporting on, subjects connected with outdoor sanitary work and a viva voce examination, will have reference to State Medicine and applications of Pathology and Sanitary Science and will comprise the following subjects:—

Laws and Statutes relating to Public Health. The Model By-Laws of the Local Government Board and regulations for prevention of Plague, Cholera, and Yellow Fever, sanitation of dwellings, schools, factories and workshops and of villages and towns. Inspection of slaughter-houses, cow-sheds, etc. Inspection of meat and other articles of food. General epidemiology with special reference to the origin, pathology, symptoms, propagation, geographical distribution and prevention of the epidemic, endemic and other infectious diseases, both of temperate and tropical climates. The methods applicable to the medical investigation of the epidemics. Effects on health of overcrowding, vitiated air, impure water, polluted soils and bad or insufficient food. Unwholesome trades and occupations and the diseases to which they give rise and the prevention of nuisances arising therefrom. Nuisances injurious or dangerous to health. Nature and origin of parasitic diseases. The effects on health of season and climate. Duties of sanitary authorities and their officers. The principles and methods of vital statistics in relation to public health.

0. 265. The Degree will not be conferred until both parts of the examination have been passed.

(37A).—DIPLOMA IN PUBLIC HEALTH.*

(In force from June 1939).

Admission.

0. 264A.

No candidate shall be admitted to this examination unless he has passed not less than two years previously, the examination for the Degrees of Bachelor of Medicine and Surgery of this University or of any other University recognised by this University, or taken the Degree of Licentiate of Medicine and Surgery of this University.

The Ordinances and Regulations for the Diploma in Public Health will come into operation from 1st June 1939, so that the first examination for Part I of the Diploma in Public Health will be held in April 1940 and that for Part II in April 1941.

The examination shall be divided into two Parts, Part I and Part II. A candidate must pass in all subjects of Part I before being admitted to the examination for Part II. A candidate may appear in Part I (but not Part II) of the examination on completion of a year after graduation, provided that after passing any of the qualifying examinations mentioned above he has attended during a period of six months courses in:—

- (1) Bacteriology and Parasitology (including Medical Entomology and Protozoology, Helminthology and Immunology) especially in their relation to diseases of man and to those diseases of the lower animals transmissible to man. (Duration of the course: at least 140 hours.)
- (2) Chemistry, Physics, Radiology, Electrology, Meteorology and Climatology in relation to Public Health. (Duration of the course : at least 140 hours.)

A candidate can appear in Part II after producing the certificates to the effect that—

- (a) he has passed Part I of the examination.
- (b) he has during six months been engaged in acquiring practical knowledge of the duties, routine and special, of Public Health Administration under the supervision of a Medical Officer of Health and has received from this Officer or other responsible Officer, during periods of not less than three hours each on sixty working days, practical instruction in the following subjects in a recognised institution:—
 - Maternity and Child Welfare Service;
 Health Service for Children of School age;
 - (3) Venereal Disease service;(4) Tuberculosis service;

(5) Industrial Hygiene;

(6) Inspection and Control of Food, including meat and milk. (Instruction in (1) to (6) should include attendance at the Centres, Clinics, Institutions and premises concerned.)

Certificates of having received the prescribed instruction in Public Health Administration must be given by the Health Officers of Bombay, Calcutta or Madras. The Laboratory instruction and practical knowledge of Public Health Administration given in any part of the United Kingdom and approved by the General Medical Council will be accepted.

(c) he has received during not less than 80 hours from a Teacher approved by the University, instruction in the following subjects:—

The Principles of Public Health and Sanitation ... 30 hours. Epidemiology and Vital Statistics ... 20 , Sanitary Law and Administration ... 20 , Sanitary Construction and Planning ... 10 , (the numbers indicate the approximate proportion of hours to be devoted to each subject.)

(d) he has attended during three months the practice of a Hospital for Infectious Diseases of at least 50 beds at which opportunities are afforded for the study of clinical instruction in Infectious Diseases and methods of Administration. At least twenty-four attendances of not less than two hours each, shall be required.

Part I

Part I will consist of two papers and a practical examination in the Laboratory work and viva voce examination, the contents of the papers being distributed as under:

Electrology, Meteorology, Paper I-Physics, Radiology, Climatology and Chemistry.

Paper II—Bacteriology, Parasitology, Protozoology, Helminthology and Immunology.

R. 236A.

Syllabus.

I. Physics, Radiology, Electrology, Meteorology and Climatology.

The determination of specific gravities of solids and liquids. Properties of gases and liquids; the laws governing the behaviour of these; the general laws of mechanics, heat, hydrostatics, hydraulics etc. as they apply to Public Health, questions of ventilation, heating, water-supply, drainage etc. Humidity and its determination. Electro-conductivity and its measurements. Properties of Light. The construction and use of Microscope, Polariscope and Spectroscope.

Radiology and Electrology in relation to Public Health. Equipment and installation of apparatus. Diagnostic and therapeutic Safeguards laid down by National Physical Laboratory. Selection and subsequent supervision of patients. General management of department.

The Principles of Meteorology; its relationship to health and disease; the construction and use of meteorological instruments and the recording and correction of meteorological data. The monsoons and chief constant winds of India. The reading of weather charts.

Causes and conditions which influence climate. The relationship of climate to health and disease; acclimatisation.

II. Chemistry.

- The use of a chemical balance, alkalimetry and acidemetry.
- Preparation and use of standard solutions.
- The theory and determination of Hydrogen ion concentration. The chemical analysis of water—qualitative and quantitative. The interpretation of the sanitary analysis of water. A knowledge of Indian waters.

The Chemical examination of alum, lime, bleaching powder and other substances used in water purification.

Chap. XXXIV] DIPLOMA IN PUBLIC HEALTH: SYLLABUS (PART I) 453

The detection and estimation of poisonous metals in water. Microscopic examination of deposits, the common algæ, etc., in water.

The Chemical examination of sewage and sewage effluents.

- (5) The Chemical examination of air and its impurities.
- (6) The Chemical examination of milk, milk products, edible fats and oils.
- (7) Theoretical knowledge of the composition of common food-stuffs and their adulterants. The examination of flour, bread etc. and detection of adulterants. The microscopic examination of food-stuffs. The examination of animal and vegetable parasites.
 - (8) The examination of tea, coffee, chicory, cocoa, mustard, etc.
- (9) The examination of vinegar, lime juice, beer, spirits and other liquid food and drink. The detection of poisonous materials and poisonous metals; the consideration of preservatives and colouring matters and detection of these.
 - (10) The examination and analysis of disinfectants.
- ${\it III. Bacteriology, Parasitology, Protozoology, Helminthology:} \\ Immunology:$

A-Bacteriology:

- (1) General characters of micro-organisms; classification, morphology, biology of bacteria; conditions of growth and multiplication; aerobiosis and anæro-biosis.
- (2) Bacteriological examination of water. Collection of water samples. Special methods adopted for examination and the interpretation of the results; standards of purity.
 - (3) Bacteriological examination of sewage.
 - (4) Bacteriological examination of soils.
 - (5) Bacteriological examination of air.
- (6) Bacteriological examination of food-stuffs with special reference to food poisoning.
- (7) The discovery and isolation of organisms in infectious diseases.
- (8) Principles of Serum therapy, vaccine therapy and immunization; their application in disease prevention.
- (9) The study of the following diseases in particular and the causative organisms:—

Pyococoal infections, pyæmia, septicæmia, gonorrhea, cerbrospinal meningitis, pnemonia, influenza, Malta fever, typhoid and coli group of infection, food poisoning, dysentery, plague, cholera, glanders, tetanus, anærobic wound infections, anthrax, leprosy. actinomycosis, Madura foot and other streptothrix affections.

B—Helminthology. The life history, characters and structure of the alimentary canal when present and of the reproductive system of—

Cestodes: Taenia solium, Taenia saginata, Diphyllobothrium latum, Taenia echinococcus, Hymenolepsis nana, Hymenolepsis diminuta.

Trematodes: Schistosoma haematobium, Schistosoma mansoni, Schistosoma japonioum, Clonorchis sinensis, Paragonimus westermannii, Fasciolopsis buski.

Nematodes: Ascaris lumbricoldes, Oxyuris vermicularis, Ancylostoms duodenale, Necator americanus, Strongyloides stercoralis, Trichinella spiralis, Trichiuris trichiura, Dracunculus medinensis, Filaria los, Filaria bancrofti.

Protozoology: Origin, general morphology, biology, recognition etc. and life history of the following:—Endamoeba coli, Endamoeba histolytica, Endamoeba gingivalis, Endolimax nana, Iodamoeba butschlii, Cercomonas, Bodo, Trichomonas, Giardia, Aerpetomonas, Leishmania donovani, Leishmania tropica, Piroplarms, Malaria parasites of man. Proteosoma, Halteridinm, Haemogregarines, Sarcosporidia, Rhinosporjdium seeberi, Balantidium coli.

The causative organisms of Relapsing fever, rat bite fever, Vincent's angina, Syphilis, Yaws, epidemic jaundice, yellow fever, rabies.

D—Entomology: Entomological methods, collecting, preserving and packing. The life histories, bionomics recognition of flies and blood sucking arthropodes, mosquitoes (Culicines and Anophelines), house-flies, tsetse flies, sand-flies, fleas and lice, with special reference to common malaria carrying mosquitoes of India.

The poison apparatus of snakes and other venomous animals.

Part II

Part II will consist of two papers as under, a practical examination, a report on subjects connected with outdoor sanitary work and a viva-voce examination:

Paper I—Epidemiology and Endemiology and Vital statistics. Paper—Practical Sanitation and Sanitary Law.

Syllabus

I. Epidemiology and Endemiology.

The causes, pathology, clinical history, diagnosis, prognosis, and prevention of (a) Epidemic and Endemic Diseases, (b) the Epizootics which affect man: (c) contagious or infectious diseases; (d) diseases incidental to particular trades, or otherwise produced by the surroundings of the patient. Candidates will be examined practically in a Hospital for Infectious Diseases.

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- II Practical Sanitation.
- (1) Dwellings and Public Institutions—site, environment, influence of soil, position and aspect.

Climate, Meteorological and Geological conditions.

Principles of Design and Construction. Characters, Fitness and Qualities of Materials (Brick, Cement, Earthenware, Iron, Lead).

Warming and Ventilation—principles and suitability of various methods.

Sanitary principles in their special application to schools, barracks, common lodging houses, workshops and factories.

- (2) Water supply—
 - Relative eligibility of various sources of supply. Estimation of yield. Methods of utilising various sources of supply. Storage. Purification. Distribution. Amount required. Modes of pollution and their detection.
- (3) Refuse and Sewage disposal-
 - Character and quality of matters to be disposed of in Urban and Rural districts. Various methods of collection and disposal with practical details as to their relative advantages and disadvantages. Sewage purification; various methods with design and general principles of necessary works. Disposal of dry refuse. House drainage; principles and practical details: House sanitary appliances (W. U.s Sinks, Cisterns etc.) Testing of Drains and sanitary appliances. Sewers: constructions and ventilation.
- (4) Establishments connected with Food supply—e. g. Dairies and Cowsheds, Cremeries, Bakehouses, Ice Cream shops, Slaughter houses.
 - (5) Meat and Food inspection—
 (Candidates will be examined practically on Meat inspection.)
 - (6) Communicable Diseases—
 - Epidemic and Endemic—Epizootic Diseases—Means of prevention; precautions advisable where outbreaks are threatened; port sanitary measures; quarantine.
 - (7) Hospitals for Infectious diseases-
 - Principles of design; accommodation required, hospital administration.
- (8) Disinfection—Disinfectants and disinfecting apparatus, their selection and practical application.
- (9) Disposal of the Dead—Burial, Cremation, and other methods of disposal.
 - (10) Nuisances and offensive trades.

- (11) Dangerous and Unhealthy occupations—Methods of preventing or mitigating their effects.
- (12) Effects upon Health of—Overcrowding, Air Pollution, impure water, defective drainage, general insanitary surroundings, insufficient or unsound food.
- (13) Examination of and written report upon the sanitary condition of premises to which the candidate may be sent.

III. Sanitary Law

The history of Sanitary Law and Administration in India, Great Britain and other countries. The present system of Sanitary administration in India. The Sanitary Laws and enactments of India and Great Britain. The duties of Health Officers, Sanitary Inspectors, Factory Inspectors, Certifying Surgeons. Port Health Laws and duties of Port Health Officers.

IV. Vital Statistics

The collection, mode of calculation and the interpretation of vital statistics. The census, calculation of population, birth-rates, death-rates, marriage-rates, infantile mortality rates, etc. Elementary statistical methods and their application and interpretation. Life tables. The preparation of Sanitary reports. The study of the Annual Reports of Public Health Commissioner and Directors of Public Health in India; methods of epidemiological investigation.

0, 265A.

The Degree will not be conferred until both parts of the examination have been passed.

(38).—DOCTOR OF MEDICINE.

Admission.

0. 266.

Every candidate for the Degree of Doctor of Medicine must have taken the Degrees of Bachelor of Medicine and Bachelor of Surgery of this University or of any University recognized by this University, or of Licentiate of Medicine and Surgery of this University, and must have passed the examination for the said Degrees not less than two years previously.

O. 266A.

On a new application being forwarded and a fresh fee paid, a candidate who has already passed the Examination for the M.D. degree in one branch may present himself again for the same Examination on a subsequent occasion subject to the following conditions:—

(1) If he has passed in one branch he may appear in another branch, provided that he has satisfied the conditions laid down in O.267 with regard to the branch in which he wishes to appear on a subsequent occasion.

(2) Such a candidate shall be entitled to exemptions in accordance with O. 145.

(3) Sub-clauses (1) and (2) of this Ordinance shall apply mutatis mutandis to candidates passing the Examination or appearing for the Examination in accordance with Regulation 238.

Chap. XXXIV] DOCTOR OF MEDICINE: ADMISSION

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- 0. 267. Every candidate presenting himself for the M. D. Examination must send to the Registrar together with his form of entry a certificate either—
 - (i) of having been engaged in continuous professional practice for not less than five years, one of which at least he must have spent in postgraduate study of the particular branch in which he presents himself for the examination at a recognized Hospital or Institution, subsequently to having passed the examination for the Degree of L. M. & S. or M. B., B. S. Degrees;

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(ii) of having been engaged in continuous practice in a Hospital or institution recognized by this University for not less than three years, one of which at least be must have spent in postgraduate study of the particular branch in which he presents himself for the examination at a recognized Hospital or institution subsequently to having passed the examination for the Degree of L. M. & S. or M.B., B.S. Degrees;

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(iii) of having spent at least two years in postgraduate study of the particular branch in which he presents himself for examination at a Hospital or Institution recognized for the purpose, subsequently to having passed the examination for the Degree of L. M. & S. or M.B., B.S. Degrees;

or

- (iv) (a) in the case of Branch I of having held, for at least six months, an approved appointment at a Hospital recognized for the purpose, subsequently to having passed the examination for the Degree of L. M. & S. or the M.B., B.S. Degrees;
 - (b) in the case of Branch II, of having held for at least twelve months an approved Pathological appointment at an Institution recognized for the purpose, subsequently to having passed the examination for the Degree of L. M. & S. or the M.B.,B.S. Degrees: Provided that the incumbent has put in postgraduate studies in the following branches of Pathology under the direction and to the satisfaction of a recognized University Teacher:—

(1) Morbid Anatomy and Histology, in the study of phases and stages of Pathogenesis;

(2) Parasitology, including Bacteriology and Protozoology in connection with the Etiology of diseases;

(3) Clinical Pathology;

- (4) Studies relating to Experimental Pathology.
- (c) In the case of Branch III of having held for at least six months an approved appointment in Obstetrics and/or

Gynæcology at a Hospital recognized for the purpose, subsequently to having passed the examination for the degree of L. M. & S. or M.B., B.S. degrees; provided that where a student holds an approved appointment in Obstetrics or Gynæcology only, he shall not be qualified to appear for the examination unless he undergoes a Postgraduate Course in the other subject, i. e., Gynæcology or Obstetrics, as the case may be, for a

period of six months.

(d) In the case of Branch IV of having held for at least 12 months an approved appointment at a Pharmacological Institution or Unit recognized for the purpose or in the Seth Gordhandas Sunderdas Medical College, subsequently to having passed the examination for the degree of L. M. & S., or the M.B., B.S. degrees; provided that the incumbent has put in postgraduate studies in the following branches of Pharmacology under the direction and to the satisfaction of a recognized University Teacher :-

Experimental Pharmacology.

Biological assay and standardization.

Chemical Pharmacology. (3)

0. 268. Ordinance 268 has been deleted.

- Each candidate must also produce testimonials signed by at least 0. 269. two Doctors of Medicine or Masters of Surgery showing that he is, in habits and character a fit and proper person for the Degree of Doctor of Medicine.
- 0. 270. A candidate who fails to pass the examination, though his thesis has been accepted, must take the whole examination at any subsequent entry or may submit the same thesis or another thesis for consideration in connection with such subsequent entry for the examination.
- A candidate whose thesis has not been accepted must take the 0. 271. whole examination at any subsequent entry or may submit another thesis for consideration in connection with such subsequent entry for the examination.
- A candidate who takes the whole examination and fails to pass 0. 272. must either again take the whole examination at any subsequent entry or may submit a thesis for consideration in connection with such subsequent entry for the examination.
- The examination in Branches I to IV will consist of-R. 237.

Branch I .- Medicine and Diseases of Children.

- One paper in Medicine, including Mental Diseases, Medical Applied Anatomy and Diseases of Children.
- One paper in Pathology including Pathology of Tropical (B) Diseases, (common to Branches I and II).

One paper in General Medicine, (common to all the four (C) Branches).

Chap. XXXIV] DOCTOR OF MEDICINE: SYLLABUS

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- (D) An Essay on one of the two subjects in Medicine including the History of Medicine.
- (E) A clinical, an oral and a practical examination.

Branch II .- Pathology.

- (A) One paper in Pathology, including Bacteriology.
- (B) One paper in Pathology including Pathology of Tropical Diseases, (common to Branches I and II).
- (C) One paper in General Medicine, (common to all the four Branches.)
- (D) An essay on one of the two subjects in Pathology including History of Pathology and Bacteriology.
- (E) Laboratory examination, including an oral, a practical and a post mortem examination.

Branch III.—Midwifery (including diseases of infants and Gynaecology).

- (A) One paper in Midwifery and Diseases of Infants.
- (B) One paper in Gynæcology.

 Paper (A) and (B) shall each include one question on Pathology.
- (C) One paper in General Medicine, (common to all the four Branches).
- (D) An essay on one of the two subjects in Midwifery and Diseases of Women.
- (E) A clinical, an oral and a practical examination.

Branch IV. Pharmacology.

- (A) One paper on the theoretical and experimental aspects of Pharmacology and Toxicology (including Bio-Assay, Chemical Pharmacology, etc.)
- (B) One paper in Applied Pharmacology, and Therapeutics (including physiotherapeutics, immunotherapeutics.)

 The paper may include questions on general, experimental and functional pathology.
- (C) One paper in General Medicine, (common to all the four Branches.)
- (D) An essay on one of the two subjects in Pharmacology and Therapeutics including the history of the subject.
- (E) A laboratory examination, including an oral and a practical examination.
- R. 238. Any candidate for the M. D. Degree may transmit to the Registrar with his form of entry and the certificate referred to above, not less than two months before the commencement of the examination, a thesis embodying the results of his own independent

published or unpublished research, and having definite relation to the branch of Medicine in which he is a candidate. The candidate must indicate in what respect his thesis appears to him to advance medical knowledge or practice. If the thesis be judged of sufficient excellence by the Examiners, the candidate may be exempted from a part or from the whole of the written examination; but in all cases he shall be submitted to the clinical, practical and oral examinations above referred to.

(39).—DOCTOR OF HYGIENE.

Admission.

- O. 273. This examination is open only to such candidates as have passed at least two years previously, the examination for the Degree of Bachelor of Hygiene of this University or a similar examination of any other University accepted by the Academic Council as equivalent thereto.
- 0. 274. No candidate shall be admitted to this examination unless he produces a certificate of having attended, since his obtaining the Degree of Bachelor of Hygiene, out-door and in-door work of a Medical Officer of Health for one year under the supervision of an approved Health Officer* or of having been employed for at least one year as Health Officer of a town of not less than 1,00,000 inhabitants.
- O. 275. Each candidate must also produce testimonials signed by at least two Doctors of Medicine or Masters of Surgery showing that he is, in habits and character, a fit and proper person for the Degree of Doctor of Hygiene.
- R. 239. The examination will be conducted as follows:-
 - (i) Public Health—Three papers and a Practical and an Oral Examination.

(a) Sanitation and Sanitary Medicine—Two papers.

- (b) Practical Sanitation, including Sanitary Engineering in relation to Public Health and Vital Statistics—One paper.
- (ii) Sanitary Laws of England and India—One paper and an Oral Examination.
- R. 240. Candidates will be required to show a competent knowledge of Sanitary Science in all its branches. The scope of the examination will be fuller than that for the Degree of Bachelor of Hygiene and will also include legislative measurss concerning foodstuffs and control of the same in different countries; preservation of food; food during famine and its effects on health; practical sanitation, including Sanitary Engineering; personal Hygiene; clothing; physical education; Hygiene of childhood and School Hygiene; Hygiene of traffic; Hygiene of markets, fairs, famine camps, etc; Marine Hygiene; Professional Hygiene and care of Working Classes; Demography;

^{*}The Health Officers approved at present are the Health Officers of Bombay, Calcutta and Madras.

Chap. XXXIV]

MASTER OF SURGERY

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Geography of infectious diseases; history of previous epidemics and lessons taught by them.

- R. 241. Candidates will be required to solve sanitary problems involving Mathematics up to the standard of the First Year's Course in Arts and use of Logarithms.
- R. 241A. Any candidate for the D. Hy. degree may transmit to the Registrar with his form of entry and the certificates referred to above, not less than two months before the commencement of the examination, a thesis embodying the results of this own independent published or unpublished research, and having definite relation to Hygiene. The candidate must indicate in what respect his thesis appears to him to advance medical or scientific knowledge. If the thesis be judged of sufficient excellence by the Examiners, the candidate may be exempted from a part or from the whole of the written examination; but in all cases he shall be submitted to the practical and oral examination above referred to.
- O. 275A. A candidate who fails to pass the examination, though his thesis has been accepted, must take the whole examination at any subsequent entry or may submit the same thesis or another thesis for consideration in connection with such subsequent entry for the examination.
- O. 275B. A candidate whose thesis has not been accepted must take the whole examination at any subsequent entry or may submit another thesis for consideration in connection with such subsequent entry for the examination.
- O. 275C. A candidate who takes the whole examination and fails to pass must either again take the whole examination at any subsequent entry or may submit a thesis for consideration in connection with such subsequent entry for the examination.

(40).—MASTER OF SURGERY.

Admission.

- Every candidate for the Degree of Master of Surgery must have taken the Degrees of Bachelor of Medicine and Bachelor of Surgery of this University or of any University recognized by this University, or the Degree of Licentiate of Medicine and Surgery of this University, and must have passed the examination for the said Degrees not less than two years previously.
- 0. 277. Every candidate presenting himself for the M. S. Examination must send to the Registrar, together with the form of entry, a certificate either—
 - (i) of having been engaged in continuous professional practice for not less than five years, one of which at least he must have spent in postgraduate study of Surgery at a recognized Hospital or Institution, subsequently to having passed the examination for the Degree of L. M. &. S. or the M. B., B. S. Degrees;

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(ii) of having been engaged in continuous practice in a Hospital or institution recognized by this University for not less than three years, one of which at least he must have spent in post-graduate study of Surgery at a recognized Hospital or Institution, subsequently to having passed the examination for the Degree of L. M. & S. or the M.B., B.S. Degrees;

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(iii) of having spent at least two years in postgraduate study of Surgery at a Hospital or Institution recognized by this University, subsequently to having passed the Examination for the Degree of L. M. & S. or the M. B., B. S. Degress;

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(iv) of having held for at least six months an approved appointment in Surgery at a Hospital recognized for the purpose, subsequently to having passed the examination for the Degree of L. M. & S. or the M.B., B.S. Degrees;

and

of having taken a course in Regional Anatomy and Operative Surgery on the cadaver at a recognized Institution.

- N. B.—No certificate shall be issued under the above paragraph, unless the person certifying is thoroughly satisfied with regard to the practical course undergone by the candidate.
- Q. 278. Any candidate for the M. S. Degree may transmit to the Registrar together with his form of entry and the certificate referred to above, not less than two months before the commencement of the examination, a thesis embodying the results of his own independent research, and having definite relation to a Branch or Branches of Surgery. The candidate must indicate in what respect his thesis appears to him to advance surgical knowledge or practice. If the thesis be judged of sufficient excellence by the Examiners, the candidate may be exempted from a part or from the whole of the written examination; but in all cases he shall be submitted to the clinical, practical and oral examinations and operations on the cadaver above referred to.
- 0. 279. Ordinance 279 has been deleted.
- O. 280. A candidate must also produce testimonials signed by at least two Masters of Surgery or Doctors of Medicine showing that he is, in habits and character, a fit and proper person for the Degree of Master of Surgery.
- O. 281. A candidate who fails to pass the examination, though his thesis has been accepted, must take the whole examination at any subsequent entry for the examination or may submit the same thesis or another thesis for consideration in connection with such subsequent entry for the examination.
- O. 282. A candidate whose thesis has not been accepted must take the whole examination at any subsequent entry or may submit another

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DIPLOMA IN OPHTHALMOLOGY

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thesis for consideration in connection with such subsequent entry for the examination.

- O. 283. A candidate who takes the whole examination and fails to pass must either again take the whole examination at any subsequent entry or may submit a thesis for consideration in connection with such subsequent entry for the examination.
- R. 242. The candidate shall be examined in Surgery in all its branches. The examination will consist of—

Two papers in Surgery.

One paper in Pathology including Bacteriology and Surgical Anatomy.

An essay on one of two subjects in Surgery including the History of Surgery.

A clinical examination.

Operations on the cadaver.

An Oral and Practical examination with examination of Pathological specimens and X-Ray Skiagrams.

(41).—DIPLOMA IN OPHTHALMOLOGY.

- 0. 284. The University shall grant a Diploma in Ophthalmology.
- O. 285. The examination shall be open to Graduates in Medicine and Surgery of this University or of any University recognized by this University.
- O. 286.

 No candidate will be admitted to this examination unless he produces a certificate showing that he, having passed the L. M. & S. Examination or having passed the M.B., B.S. Degrees Examination, has been engaged for not less than one year in the postgraduate study of Ophthalmology at a recognized hospital or institution (the course may be taken at one or several hospitals which must cover a period of one year) and on production of the following certificates:—
 - (a) of having attended the clinical practice of an Ophthalmic Hospital or Ophthalmic Department of a General Hospital (having at least 20 ophthalmic beds) recognized by the Bombay University, for a period of 12 months, in the course of which he has been engaged in the correction of errors of refraction and study of Ophthalmic Medicine and Surgery and the relation of Ophthalmology to General Medicine. [The conditions of this certificate will be fulfilled by holding the appointment as House Surgeon or House Physician or as Clinical Assistant or as Tutor or as Postgraduate at one of the recognized hospitals or Ophthalmic Department of a General Hospital.]
 - (b) of having attended at an institution recognized by the Bombay University for the purposes of the M. B., B. S. Examination—

(i) a course of study in Optics,

(ii) a course of study in the Anatomy and Physiology of the eye,

- (iii) a course of study in Pathology and Bacteriology with special reference to Ophthalmic Medicine and Surgery,
- (iv) a course of Ophthalmic Operative Surgery.
- R. 243. The examination shall be partly written and partly viva voce and practical. There shall be four papers in the written examination as follows:—
 - (1) Anatomy, Physiology and Optics,
 - (2) Bacteriology and Pathology of the eye,
 - (3) Ophthalmic Medicine and Surgery,
 - (4) The relation of Ophthalmology to General Medicine.
- R. 244. The Subjects shall be-
 - (a) The Anatomy and Embryology of the Visual apparatus, including the contents of the orbit, the bones in the neighbourhood thereof and the central nervous system as far as it relates to vision,
 - (b) The Physiology of vision,
 - (c) Physiological Optics,
 - (d) Errors of Refraction,
 - (e) Ophthalmic Medicine and Surgery,
 - (f) Pathology and Bacteriology in relation to diseases of the eye,
 - (g) The relation of Ophthalmology to General Medicine, and
 - (h) Operative Surgery.

CHAPTER XXXV.—UNIVERSITY DEPARTMENTS.

I. THE DEPARTMENTS OF ECONOMICS AND SOCIOLOGY.

(1) Aims and objects

The object of the Departments is to promote the study of the Indian Social and Economic Conditions and Institutions with reference to their effects on the social and economic life of the people by conducting research in Economics and Sociology.

The Sociology Department was started in 1918 with the appointment of Professor Patrick Geddes as Professor of Sociology. The Economics Department was opened in 1921. At present these Departments prepare students for the M. A. degree examination of the Bombay University both in papers and thesis. Candidates for the Ph. D. degree are also registered from June 1935; besides, other research workers are given facilities.

It is hoped that in course of time these Departments will develop into an institution where all social sciences will be taught, and facilities for research in them, provided.

(2) Members of the Staff

C. N. Vakil, M. A. (Bom.), M. Sc., Econ. (London), F. S. S, Professor of Economics, Head of the Department of Economics

G. S. Ghurye, M. A. (Bom.), Ph. D. (Cantab.)

Professor of Sociology, and Head of the Department of Sociology.

N. A. Thoothi, B. A. (Bom.), D. Phil. (Oxon.),

D. Ghosh, M. A. (Cal.), M. A. (Cantab.), Bar-at-Law, Reader in Economics.

(3) Library

The library of these Departments contain a good collection of works on Economics and Sociology, and is probably the best of its kind in Western India. The total number of publications in the library exceeds 24,000 including Government Publications, volumes of journals, etc. Efforts are being made to keep the library up-to-date and well organised, so that it may become the centre of research in Social Sciences on this side of the country.

The library is open for reference during term time from 11 a.m. to 6-30 p.m. on week days except Saturdays, when it is closed at 4 p.m. During vacations it is open from 11-30 a.m. to 4 p.m. The Library is closed on Sundays and public holidays.

Research students of these Departments have easy access to the Library of the Bombay Branch of the Royal Asiatic Society located in the Town Hall. In addition to this, arrangements are made for students to consult books of reference in the Record office and the Secretariat in Bombay, the Imperial Library at Calcutta, and other institutions.

(4) Fellowships and Scholarships

In order to encourage research workers, the University has instituted four Fellowships, each of the value of Rs. 75 per month and eight Scholarships, each of the value of Rs. 30 per month, which are awarded on certain conditions to deserving candidates. Rules regarding the award of scholarships and fellowships will be found in Section 11 (b) and (c).

It may be pointed out that endowment of suitable research scholarships is one of the ways in which individuals and bodies interested in Economics and Sociology can co-operate in the work of these Departments.

(5) Academic Terms

The Academic year begins in June and consists of two terms. The first begins on June 20, and ends on October 10. The second term begins on November 10, and ends on March 10.

(6) Membership of the Departments

(a) For Graduates of Bombay University.

Those who have obtained the B. A. degree of the Bombay University are eligible for admission to the Departments on payment of the fees mentioned below.

(b) For Graduates of other Universities

A graduate of another University seeking admission to these Departments shall apply to the Registrar of this University for a certificate of eligibility, and shall at the same time pay a fee of Rs. 20. Such fee shall not be returned if an eligibility certificate is issued to the applicant. But if no such certificate can be issued by the University for any reason, one-half of the said fee shall be retained by the University and the other half shall be returned. No graduate of another University shall be admitted to these Departments except on production of a certificate of eligibility, signed by the Registrar of this University. The Registrar may issue a provisional certificate of eligibility if he is satisfied that the applicant is prima facie eligible for admission to this University. Such provisional certificate shall entitle a graduate to admission to these Departments, at his own risk, and on condition that he obtains a final certificate of eligibility before the close of the academic term in which the student is provisionally admitted to the University.

No graduate of another University seeking admission to these Departments shall be admitted to it after the expiry of one month, from the date of the commencement of any term.

(c) Time for Admission of Students.

Students intending to read for the M. A. degree examination by papers will be admitted only in the beginning of the academic year.

Research students reading for the M. A. degree by thesis or fo the Ph. D. degree may be admitted any time during the academic year

(d) Post-Graduate Registration Fee.

All candidates for post-graduaet degrees are required to register themselves as such at the office of the University Registrar on payment of a fee of Rs. 5 for the M. A. degree and Rs. 10 for the Ph. D. degree

(e) Term Fees.

A fee of Rs. 30 per term is charged to students attending the School.

(f) Caution Money.

A sum of Rs. 10/- will be charged as Caution Money from every student joining the Departments; this amount will be returned when the student leaves the Departments, provided he has paid in full all claims against him.

N. B.—Casual Students—Those who are not qualified to be members of the Departments according to the conditions mentioned above may be admitted to the Departments as special cases. Applications from such candidates will be considered on their own merits.

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(7) Rules for the M. A. Degree Examination by Papers.

(a) Certificate of Guidance.

Except in special cases, all candidates for postgraduate degrees must work under a University Professor, a whole time University Teacher or a University Teacher. A certificate of guidance from a recognised teacher must accompany the candidate's application to appear at the M.A. Examination.

(b) Attendance at Lectures.

Candidates for the M.A. Examination are not eligible to appear for the same unless they produce evidence to the effect that they have attended *two-thirds* of the number of lectures, if any, delivered by each Teacher under the postgraduate scheme in the subjects of their Examination.*

(c) Examination Fees.

Candidates for the M.A. Examination must forward an application to the Registrar at least two months before the Examination along with a fee of Rs. 75.

(d) Re-appearance at the Examination.

Failure to pass the Examination will not disqualify the candidate from presenting himself at any subsequent M. A. Examination on a new application being forwarded and a fresh fee paid.

(e) Ex-Students.

- (1) An ex-student is one who has satisfied all the requirements of prescribed course of studies at his College, including the necessary minimum attendance, and is certified by the Principal as eligible for admission to an examination, and after certification does not join a College.
- (2) A student falling under the definition of ex-student under rule (1) shall be entitled to receive a certificate from the Principal of the College last attended by him as mentioned in the said rules whether or not he appears at the examination in the year in, which he is so certified.
- (3) A student who has appeared at an examination and failed shall not require a fresh certificate to be entitled to appear again at the same examination unless in the meantime he has joined a College.
- (4) The Principal of a College may by a certificate permit an ex-student who joined his college, and thereby forfeited his status as an ex-student, to appear for an examination, if he is satisfied with the candidate's conduct and progress, even though the candidate has not kept the terms defined in O. 87.

^{*}Those intending to migrate from one College to another for the purpose of attending lectures are hereby informed that they should do so only after the completion of one or more terms as the case may be, and not in the middle of a term.

(8) Facilities for Students taking the M. A. Degree by Papers

(a) Subjects of Study.

A candidate for the M. A. degree in "History" must choose any two of the following groups: (a) History, (b) History and Politics, (c) Economics and (d) Sociology. Each group consists of four papers. Though provision for a full time institution to guide students in groups (a) and (b) has not yet been made, inter-collegiate lectures are arranged in Bombay by the University to help students in the preparation for examination in these groups.

(b) Lectures and Instructions.

Lectures are delivered in the Departments to cover the M. A. courses in groups (c) and (d) mentioned above. Besides fulfilling all the requirements for the examination, the lectures cover a wider field so as to create interest among students for further work in the subjects.

(9) Facilities for Research Work

(a) Guidance.

In accordance with the principal object of the Departments the main work of the Departments is concerned with the encouragement and carrying out of research work in different problems relating to the economic and social conditions and institutions of India. In this connection research workers are given personal guidance by the members of the staff at all stages of their work. All methods of research work are encouraged.

A student may decide for himself the teacher under whom he proposes to carry on research. In point of fact as well as of principle, however, every teacher in the Departments is equally accessible for consultation and advice to any student.

(b) Rules for the Award and Tenure of Research Scholarships in the Departments.

- (i) There shall be not less than eight scholarships in all which shall normally be equally divided between the Departments of Economics and Sociology.
- (ii) Each scholarship shall be of the value of not more than Rs. 30 per month. It shall be open to the University Teachers to recommend the amount of scholarship to be awarded to each scholar, without exceeding the total budget grant for scholarships in these Departments.
- (iii) The scholars shall be appointed each year in the month of August by the Board of Post-graduate Studies on the recommendation of the University Teachers. The selection of scholars shall be based on their class work, their previous career, character and conduct, and their financial needs.

- (iv) Scholarships shall be awarded on the explicit undertaking* given in writing by the scholars that they shall not attend the Law Classes, and shall present themselves for the M. A. (thesis) or the Ph. D. Examination in due course.
- (v) A scholar, who does not fulfil the undertaking referred to in Regulation (iv), will be liable to refund the whole amount of scholarship drawn by him while he was holding.
- (vi) Every scholarship shall be paid quarterly in arrears on production of a certificate of regular attendance and satisfactory progress signed by the University Teacher in charge.
- (vii) A scholar shall be liable to forfeit his scholarship on ground of irregular attendance, unsatisfactory work or conduct.
 - (c) Rules for the Award and Tenure of Research Fellowships

The rules for the Award and Tenure of Research Fellowships are similar to those applicable to Scholarships with relevant changes. The Fellows will be required to give the following undertaking:—

- I, the undersigned Research Fellow in the School of Economics and Sociology, University of Bombay, do hereby agree to abide by the conditions laid down as under:—
 - 1. To begin the work of research within one month from the date of award in case it is not already begun, engage myself diligently in the investigation undertaken by me and to submit terminal reports of the progress of the work to the Syndicate in accordance with the rules framed by the Syndicate from time to time.
 - 2. During the tenure of Fellowship not to accept any other work or employment.
 - 3. Not to publish the results of the research without the previous permission of the Syndicate.
 - 4. At the expiry of the Fellowship to submit four printed or typed copies of a paper embodying the results of the research carried on by me and giving an account of my investigations, or in case the study of the investigation is not completed, to submit an account of the work done, and if required, the material collected either by reading or investigation.
 - 5. To refund to the University the stipends drawn by me in the event of my resigning the Fellowship before the expiry of my term, or if the Fellowship is forfeited by the University due to misconduct or unsatisfactory progress on my part, or if I fail to fulfil any of the conditions on which the Fellowship is awarded to me.

submitted my thesis.

^{*}Form of Undertaking:-

⁽¹⁾ I shall present myself for the M. A. (thesis) or the Ph. D. Examination in due course.

⁽²⁾ I shall not attend the Law class during the tenure of the Scholarship which has been awarded to me by the University.
(3) And that I shall not prepare for any other Examination till I have

(d) Theses and Publications.

The theses approved for the M. A. Degree in Economics and Sociology are preserved in the Library of the School, and are available for reference. The publication of all successful research work has not yet been possible; some of the theses have been published, partly with financial assistance from the University. Articles based on theses or summaries of theses appear in the Journal of the University of Bombay.

The scope and nature of research work done in the School, or in course of preparation will be realised from details given in Appendix I.

(10) Other Facilities

(a) M. A. Courses in Philosophy and Ancient Indian Culture.

Candidates preparing for the M. A. degree in Philosophy and Ancient Indian Culture will get facilities from the lectures and instruction given in this School.

Candidates for the M. A. degree in Philosophy who take Sociology as their optional group will get complete instruction in this group from the lectures and instruction provided in the Sociology Department of the School.

The Sociology course covers a considerable portion of the syllabus in Ancient Indian Culture, and would be useful to the candidates for the M. A. degree in this subject.

(b) Lectures on Statistics.

A short course of lectures on Statistics and their use in economic and social studies is given every alternate year. This course is designed to create interest in research work of a statistical nature. At the same time it illustrates problems, and is thus useful also to students appearing for the examination by papers.

(c) Public Lectures.

The Departments arrange from time to time series of public lectures on different subjects, either by eminent people from outside, or by Members of the Staff. Such lectures are open to the public.

(d) Tours.

With a view to create interest in first hand investigation, special tours are occasionally organised, such as visits to the cotton mills and the chawls of working classes.

(11) Co-operation with other Institutions

The Departments are fortunate in having the co-operation of different bodies and institutions in their work. The list of periodicals shows the large number of bodies which are kind enough to send their publications for the library of the Departments. Requests for help in carrying out research work have as a rule met with good

response, and efforts in this direction will meet with greater success as the work of the Departments become better known.

With the experience in research work in different problems already carried out in the Departments, with the increasing facilities in the library, and with the growing number of students, the Departments may be said to have passed their stage of infancy, and are now in a position to play that part in the life of the City and the Presidency, which a research institution is expected to do by means of systematic studies towards the solution of economic and social problems. In carrying out this desirable object however, a more active co-operation, or perhaps a continuous contact with leading men in different spheres of life and with different institutions is essential. The Departments have every hope that such co-operation and contact will be established.

In this connection attention may be drawn to the recommendations of various committees and commissions that have considered economic and social problems in recent times. The Indian Economic Enquiry Committee complained about want of adequate data. Sir Arthur Salter's recent report suggests a scheme for an Economic Advisory Organisation in India. The part that the Universities can perform in such work has been emphasised by the Royal Commissions on Agriculture and Labour.

The University of Bombay may be said to have done its duty in this connection by establishing the Departments. It is to be expected that ways and means will be found by those interested to establish active co-operation and contact referred to above with the Departments so that the equipment of the Departments can be fully utilised for the benefit of the City and the Presidency.

(12) Students' Union

A Students' Union of the past and present students of the Departments has been formed with a view to promote the cultural and social relations of the members of the Departments. The Union has been recognised by the Syndicate as a part of the Departments and its constitution has been approved. A subscription of Rs. 2/per term is paid by each student along with the school fees.

(13) University Hostel.

The University Hostel was started in June 1936. Fravic House, 79, Queen's Road, Bombay, 2, has been rented for the purpose. The house is situated opposite the Marine Lines Station, with the sea in front. It is within easy reach of the University Buildings. The University has provided adequate equipment for the comfort of the students.

The University Hostel is intended primarily for the students of this School and of the Department of Chemical Technology. Other post-graduate students may be given admission in case there is room for them. Students reading for the degree of LL.B. only need not apply.

Facilities for three dining clubs have been provided in the Hostel; two vegetarian and one non-vegetarian. Residents are required to join one of these. The Management of the Clubs is vested in the members, subject to certain conditions.

Applications for admission to the Hostel should be made before 20th June for the first term, and before 10th November for the second term. The allocation of seats in the Hostel is notified on the Hostel Notice-Board in the beginning of each term. Casual students intending to stay in the Hostel during vacations should apply before 10th October for the October vacation, and before 10th March for the summer vacation.

Forms of application can be had from the Office of the School of Economics and Sociology, or the Department of Technology or the Warden of the Hostel. As a rule students are accommodated in batches of two or three in a room. The rents vary from a minimum of Rs. 36/- per term to a maximum of Rs. 57/- per term per seat. Besides this each student has to pay Rs. 15/- per term for miscellaneous charges; viz, Rs. 7/- Electric charges; Rs. 5/-Medical charges; Rs. 2/- Union fee; Re. 1/- Mess Depreciation Fund.

Students have to pay a lock deposit of Re. 1/- and caution money of Rs. 5/-. Applications not accompanied with caution money are not considered. Applications should be forwarded through the Head of the Institution to which the student belongs.

Further information may be had from the Warden, University Hostel, 79, Queen's Road, Bombay, 2.

DEPARTMENT OF CHEMICAL TECHNOLOGY STAFF

Professor, Readers and Lecturers

Mody Professor of Chemical Technology and Head of the Department K. Venkataraman, M.A. (Madras), M.Sc.Tech., Ph.D., D.Sc.(Manc.), F.I.C., A.M.I.Chem.E.

Reader in Dyeing and Printing Vacant

Reader in Chemical Engineering G. P. Kane, M.Sc. (Bom.), Ph.D. (Lond.), D.I.C.

Lecturer in Experimental Dyeing

G. B. Jambuserwala, B. Sc. (Bom.). M.Sc. Tech. (Manc.)

Lecturer in Industrial and Tinctorial Chemistry

T. N. Mehta, B.A., B.Sc. (Bom.), Ph.D. (Lond.), D.I.C., A.I.C. Lecturer in Fuel Technology

M. R. Mandlekar, Ph.D. (Lond.), D.I.C.

Part-time Lecturers

Industrial Organisation C. N. Vakil, M.A., M.Sc. (Econ.) (Lond.), F.R.S.S. (University Professor of Economics)

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Industrial Relations

D. Ghosh, M.A. (Cal.), M.A. (Cantab), Bar-at-Law (University Reader in Economics)

Mathematics

D. S. Agashe, B.A. (Cantab.)
(St. Xavier's College)

Manufacture of Yarn and Cloth

D. F. Kapadia, B.A. (Bom.) M.Sc. Tech. (Manc.) (Victoria Jubilee Technical Institute)

Design Applied to Textile Printing C. R. Gerrard, A.R.C.A., R.O.I.

(Director, Sir J. J. School of Art)

Junior Staff

Research Assistant in Optics (and part-time Lecturer in Colloids) B. K. Vaidya, M.Sc., Ph.D. (Liverpool)

Technical Assistant in Dyeing and Printing S. R. Ramachandran, B.A. (Madras)

Demonstrator in Mechanical Engineering and Drawing (and part-time Lecturer in General Engineering and German)

P. K. Sathe, B.E. (Mech.) (Bom.)

Demonstrator in Chemical Engineering J. G. Kane, M.Sc, (Bom). A.I.I.Sc.

Demonstrator in Industrial and Tinctorial Chemistry V. B. Thosar, B.A., M.Sc. (Bom.)

Demonstrator in Dyeing and Printing S. M. Kaji, B.Sc., M.Sc. Tech.

Analytical Assistant G. K. Belekar, B.Sc., B.Sc. Tech.

Works Staff

Dyehouse Assistant M. N. Bhide.

Mechanic

A. B. Noronha

Electrician

Dilbag Singh

The Department of Chemical Technology has been instituted to form a link between science and industry, so that University graduates in pure science who intend to adopt an industrial career may obtain the necessary technological training to take an important part in industry. It performs, therefore, the dual function of providing an outlet for products of the colleges and as a supply of men suitable to the needs of the Indian industries. The courses of studies are so organised that the student is not only well grounded in the scientific principles of his subject, but has also to apply them by his own manual labour on a practical scale.

Two courses of study, textile chemistry and chemical engineering each extending over two years, have been organised. The course in

textile chemistry is intended to prepare students to occupy responsible positions in a textile mill or in an industry connected therewith, while that in chemical engineering is designed to give the student a general knowledge of chemical engineering and its application in industrial chemistry, so that he may be able to play his part in the building up of the chemical industries of the country.

Students who pursue either of these courses satisfactorily and pass the prescribed examinations and in addition fulfil the specified conditions as to works practice are awarded the degree of B.Sc. (Tech.).

Admission—The minimum qualification for admission is a B.Sc. of the University of Bombay with chemistry as principal and physics as subsidiary subjects in the second class or other equivalent qualification. A maximum of 12 students are admitted to the course in textile chemistry and a maximum of 8 students are admitted to the course in chemical engineering every year. The seats are allotted strictly according to merit.

Applications for admission must be made on the prescribed form duly completed and forwarded together with the necessary deposit (Rs. 50) so as to reach the Head of the Department not later than the 6th of June in any year.

Forms of application may be obtained on application to the Head of the Department.

Deposit Money—Each student is required to forward a sum of Rs. 50 with his application. This deposit will be returned when he has successfully completed the course, less any dues recoverable from him in respect of fines or loss or damage of any book or apparatus belonging to the Department. It will be forfeited if he fails to join the Department by the specified date or is dismissed for any cause. In the event of the student failing to obtain admission, the deposit will be returned.

Fees—The tuition fees for graduates of the Bombay University are Rs. 125 per term and for other students Rs. 200 per term.

Scholarships and Fellowships—Two scholarships, one for entrants to the course in textile chemistry and one for entrants to the course in chemical engineering, are awarded annually. These scholarships are tenable for one year and are awarded to the candidates entering the respective courses, who obtained the highest total of marks at the B.Sc. (Bom.) in that year.

Two scholarships are also awarded annually on the results of the first year's work to the students who have obtained the highest number of marks in the courses in Textile Chemistry and Chemical Engineering respectively and who, in addition, have not failed in any of the Departmental Examinations. Provision has also been made for a number of research fellowships which are available to students who have obtained the degree of B.Sc. (Tech.) in either textile chemistry or chemical engineering and who signify their intention of working for a higher degree by research.

The following scholarships have been endowed:

The Byramji Ratanji Lentin Scholarship—(Rs. 388 per annum): Awarded to the candidate who passes the B.Sc. (Tech.)

examination of the University with the highest total of marks in the branch of Textile Chemistry on condition that he continues his studies for the M.Sc. (Tech.) examination.

The Amelia, wife of Dr. A. G. Viegas, Scholarship—(Rs. 166 per annum): Awarded to the candidate who passes the B.Sc. (Tech.) examination of the University with the highest number of marks in Chemical Engineering and continues his studies for the M.Sc. (Tech.) examination.

The Chaturbhuj Jivandas Research Fellowship—(Rs. 1,529 per annum): Awarded to a candidate who has passed the M.Sc. (Tech.) examination of the University and who is carrying out research on an approved subject in the Department of Chemical Technology, tenable for one year in the first instance and renewable at the discretion of the Syndicate.

Facilities for Research.—Facilities are also provided for students working for the higher degrees of M. Sc. Tech. and Ph. D. in the Faculty of Technology. Other qualified students intending to carry out research work within the purview of the Department are also admitted if accommodation is available. The fees for the former are Rs. 30 per term, those for the latter being fixed in individual cases subject to a minimum of Rs. 30 per term.

The Department is fully equipped for the conduct of research on all the common chemical industries. A research laboratory for the accommodation of eight students, an experimental dyeing laboratory, a dyehouse carrying a complete range of semi-scale plant for all processes from singeing to finishing and a very well-equipped optical laboratory are available, in which any problem in the chemical technology of textiles can be investigated. The technical chemistry and fuel laboratories provide facilities and accommodation for several workers in these subjects. The chemical engineering laboratories, containing unit plant of every type, offer opportunities for carrying out semi-scale work on non-dangerous chemicals and for the trying out of works processes. Special apparatus and small scale plant may be fabricated in the departmental workshop.

Arrangements have been made to supply mills and factories with copies of the research papers published by the Department.

Analytical work and technical investigations.—While the primary function of the Department is to impart advanced training and facilities for research in textile chemistry and chemical engineering to suitable candidates in order to equip them to occupy responsible positions in industry, it also acts as a central research and analytical laboratory for the benefit of the industries of the Presidency, and is endeavouring to co-operate with mills and factories in carrying out research on their behalf or investigating any technical problem that may arise in the course of their work. While routine chemical analyses of every kind are undertaken on behalf of industry in general, the Department functions in particular as a Test House for the Millowners of Bombay and Ahmedabad, enabling them to obtain independent information on the dyes, chemicals and auxiliaries used in the textile industry.

EQUIPMENT.

Textile Chemistry-The large scale textile processing machinery is erected on the ground floor which has been laid out in a bleach croft. dyehouse, printing and finishing room and an experimental dyeing laboratory. The machinery is capable of processing cloth up to 36" in width and hence students have the opportunity of handling textile materials under actual works conditions. The equipment consists of a two burner singeing machine, 100 lb. high pressure kier with external heater, rope washing machine, squeezing machine, chemicking and souring tanks with pump and spray, graphode electrolyser with direct current motor generator, high speed self balancing hydroextractor, scutcher, hank mercerising machine with automatic cooling arrangement, open soaper and developing range, stainless steel wince dyeing machine. tensionless jigger with staybrite beck, nickelin hank dyeing machine, 25 lb. Thies cheese dyeing machine, Franklin cheese dyeing machine, Obermaier stainless steel cheese and cop dyeing machine, Franklin cheese winding machine, laboratory jigger, laboratory padding mangle with stainless steel rollers and back, stainless steel dyebecks, laboratory circulating pressure kier, ½ gallon, 1 gallon, 2 gallon colour mixing pans, 10 gallon mixing pan with mechanical stirrer, 3-colour printing machine and drying range, mandril forcing machine, 2-colour laboratory printing machine, rapid ager, high pressure steaming cottage, starch mangle, nine cylinder drying machine 3-bowl universal calender, padding mangle, housed-in stenter, mist spray damping machine, plaiting machine, spray printing machine and table, Hurrel homogeniser, 2000 gallon Permutit water softener, hot air drying cupboard, piece-end sewing machine, 1-ton Morris truck, stillages, 2000 lbs. cloth testing machine, lea tester, single thread tester, twist tester, ballistic testing machine, sample cutting machine and hank winding machine.

Experimental Dyeing Laboratory—This laboratory is adjacent to the dyehouse and contains the usual equipment for experimental dyeing and the examination of dyed fabrics and fibres. The dyebaths are arranged so that they may be heated by gas or steam under pressure. Special appliances such as an electrically heated drying cupboard, stainless steel wash wheel, squeezing machines, laboratory steaming cottage, hank winding machine, stiffness tester and Höppler viscometer with thermostatic control are also provided.

Technical Chemistry Laboratory—A commodius laboratory is equipped adequately for the study of dyes, dyestuff intermediates, textile auxiliaries, fixed oils and allied chemical products. Appliances are provided for reproducing works operations on a laboratory scale, and include a low tension motor generator for electrolytic work, stainless steel autoclaves for high pressure operations, copper vacuum steels and extraction apparatus, cast iron sulphonation pots, electrically heated oil hydrogenation apparatus and vacuum drying ovens.

Optics Laboratory—A special laboratory is provided for giving instruction in the use of the microscope, colorimeter, polarimeter, refractometer, spectroscope and other optical instruments. Sufficient microscopes by Zeiss, Reichert and Watson are provided for class instruc-

tion and special higher grade instruments are provided for advanced and research work. The principal items in the equipment include a Davidson "Super Microscope" and a Busch Metaphot for microphotographic work, Leitz three stage colorimeter, Lovibond B. D. H. pattern tintometer, C. P. A. carbon arc fading lamp, Quartz mercury vapour lamps, Weston and Osram photocells, Cambridge short period galvanometer, Cambridge valve pH meter, Bellingham and Stanley polarimeter, Zeiss Abbe and Pulfrich refractometers, Bellingham and Stanley glass and quartz spectrograph, Bellingham and Stanley visual photometer, Hilger E. 488 glass and quartz spectrograph and Spekker ultra-violet photometer. Special facilities are provided in this laboratory for research involving the use of high grade optical equipment, with particular reference to problems connected with industry.

Chemical Engineering Laboratory—The basic idea underlying a chemical engineering laboratory is related to the fact that all chemical manufacturing processes are made up of a series of unit operations such as crushing, pulverising, drying, mixing, heating, processing, evaporating, precipitating, filtering, distilling, and extracting. The equipment, therefore, is chosen so as to give the students facilities for studying these operations as carried out on a commercial scale.

This section of the Department consists of three main laboratories. a grinding, mixing and general purposes room, a process room and a still room. The grinding equipment consists of a Chipmunk jaw crusher, high speed disintegrating mill, flatstone mill, ball mill, end runner mill, dry mixer, sigma kneading machine, 3-roller paint grinding mill, and a micro-twin paint grinder. The process room contains a series of plain and enamelled cast iron reaction vessels of from 5 to 10 gallons capacity. One of these is direct gas fired, two are heated by steam jackets, while the remaining vessel is provided with an oil bath. For filtration experiments there is a 12 chamber plate and frame wooden washing press and a small Sweetland filter. These presses are arranged so that they may be operated either by a weighted type sludge pump or by means of a montejus and compressed air. Other filtration plant is also available such as an Oliver rotary vacuum filter, Sharples super centrifuge, 10" stainless steel high speed basket centrifuge, streamline filter and meta filter. Among the remaining processing units may be mentioned a 5 gallon high pressure stainless steel autoclave, 25 gallon shallow type cast iron evaporating pan, vacuum drying oven and a shelf drier.

In the still room all the heating is carried out by steam or electricity. The plant consists of a steam meter, horizontal type film evaporator capable of evaporating 200 lbs. water per hour, cast iron enamelled extraction plant operating on the Soxhlet principle and capable of dealing with 100 lbs. of material and a vertical film evaporator for operation in vacuum. For the study of distillation processes a copper fractionating still is provided which can be operated at ordinary or reduced pressure. This plant is fitted with two interchangeable stills, one heated by steam and the other on the oil electric system, so that it may be used for the distillation of inflammable liquids of both low and high boiling points. A 5 gallon enamelled cast iron steam heated still is also available. These

laboratories are also equipped with a vacuum pump, low pressure compressor, high pressure compressor, 5 K.V.A. step down transformer, electric furnace, Rotap sieve shaker, 1-ton platform balance, 500 lbs. platform balance, Denver concentration table, laboratory air separator, Andrew's elutriator, flotation apparatus, surface condensers, coil condensers, steam separators, pumps and air blowers, aluminium autoclave, wet gas meter, water meter, recording pyrometer, CO₂ recorder, electrical measuring instruments, metal polishing machine, and drying oven.

Fuel Laboratory—The Fuel Laboratory consists of a general laboratory for the study of fuel problems and a special furnace room. This laboratory contains the latest types of apparatus for the examination of solid, liquid and gaseous fuels. The students are also trained in pyrometry and in the testing of cements and refractories. The special equipment consists of Bone-Newitt and Orsat gas analysis apparatus, Baird and Tatlock and Griffin Sutton Bomb Calorimeters, Boy's gas calorimeter, Gray-King carbonisation assay apparatus, tar distillation apparatus, Redwood viscometer, Pensky-Martin and Abel-Pensky flash point apparatus, Fery's radiation and disappearing filament radiation pyrometers, bolometer, Collin's calcimeter, gas and electrically heated furnaces, and cement testing machines.

Workshop and Drawing Office—The Department possesses a well equipped workshop which serves the dual purpose of training students in the use of hand and machine tools and the fabrication of special apparatus. The equipment includes two modern screw cutting lathes, drilling and tapering machine, shaper, universal milling machine, power hack saw, shearing machine, grinder and forge. Benches are provided for wood and metal work. In the drawing office the students are instructed in the preparation of drawings from actual machine parts and in the making of tracings and blue prints. They are also instructed in the use of surveying instruments and in the preparation of survery drawings. The drawing office is provided with a set of engineering models.

Research Laboratory—In addition to the facilities available for research in the various laboratories, a small laboratory under the direction of the Head of the Department has been provided for research in Technical Chemistry with special reference to the chemistry of cellulose, dyes, textile auxiliaries and other organic products.

Library—The library contains most of the standard and recent text books in English and German on the various branches of chemical technology. The current literature is represented by nearly 75 journals. The back volumes of the more important of these journals are also available.

(For courses of instruction, see page 392 or detailed prospectus obtainable from the Head of the Department.)

CHAPTER XXXVI—RULES RELATING TO POSTGRADUATE STUDIES.

- 1. Every candidate for a postgraduate degree of the University shall—
 - (i) attach himself to a University Teacher or Teachers in the subject or subjects of his studies and work under him or them for the period prescribed by Ordinances;
 - Note:—The period of study shall be two calendar years of four academical terms in the case of the M.A. M.Sc., M. Com., M.Ed., and LL.M. Examinations and two years in the case of M.D. and M.S. and three years in the case of M.A.g. and M.E. Examinations.
 - (ii) pay the fee prescribed by the authorities concerned;
 - (iii) apply in the prescribed form for registration as a post graduate student of the University ordinarily in the case of those who intend to appear for examination by papers within one month of the date of commencement of the academic year in which he begins his studies.

Note:—Those who intend to take their examination by thesis can register at any time of the year.

- (iv) pay the registration fee of Rs. 5 at the office of the University.
 - Note:—Only such students as have been registered as postgraduate students and have been paying regularly the fee due to the institution to which the Teacher under whom he studies is attached shall be permitted to attend postgraduate lectures.
- 2. Every application for registration as a postgraduate student of the University—
 - (a) must be filled up in the prescribed form;
 - (b) must be accompanied by the registration fee of Rs. 5;
 - must be submitted through the Head of the Institution to which the University Teacher under whom the student proposes to work belongs.

Note:—An application wanting in any of these particulars will not be considered.

- 3. No postgraduate student will be eligible to appear for an examination by papers for a postgraduate degree unless he has attended not less than two-thirds of the number of lectures delivered in the subject.
- 4. Any registered postgraduate student of the University who is on the roll of a University Department or of a University Teacher may be allowed without payment of any extra fee to attend all

lectures relating to his subject or group, delivered under the auspices, or on behalf of the University.

Note:—The Registrar will provide a permit to such students for the purpose.

- 5. Candidates who have registered themselves for postgraduate degrees in certain specified subjects may be permitted, subject to the approval of their teachers, at the end of the first or the second term after registration, to change their subjects without losing the term or terms and be allowed—(1) to write a thesis on a subject belonging to one of the two groups (in the case of Branch II—History) registered, or (2) to take up an allied branch which has some subjects in common with the original. This concession shall not extend to those who desire to change from thesis to paper examination, provided that such changes may be allowed in the case of those who have attended lectures while preparing for their theses.
- 6. The prescribed period of study may be spread over several years, and students may be permitted, on sufficient reason being shown, to shift from one centre to another during the course of their study, provided that students who migrate from one College to another do so at the end of a term. Students for postgraduate degrees changing from thesis for paper examination must keep four terms under a recognized University Teacher and attend the prescribed number of lectures delivered in the subject or group.
- 7. Any person intending to take a postgraduate degree in a subject different from the one for which he has registered must register himself afresh by paying the prescribed registration fee.
- 8. No fresh registration is necessary when those who have taken Language for their M. A. Examination change either the Principal or the Subordinate Language.
- 9. Postgraduate students who want to change either their Principal or Subordinate Language must send formal intimation of such change to the Registrar.
- 10. A change in the Principal Language can be permitted only on the certificate of the University Teacher under whom the student proposes to study the new Principal Language.
- 11. Postgraduate students who have taken up languages may be permitted to interchange their Principal and Subordinate Languages not later than by the end of one year with the permission of the University Teacher under whom they propose to study the new Principal Language.
- 12. Students taking up a new Principal or Subordinate Language at the end of two years or after having failed in an Examination have to keep respectively at least four and two terms in the language under a recognized University Teacher, provided that in the case of those who have taken for their Principal Language their old Subordinate Language, the period of further study shall be only two terms.

- 13. A student shifting from one centre to another shall provide himself with a certificate from his Teacher in token of his having attended a term or terms at the centre which he is shifting from, and shall hand it over to the Teacher at the centre to which he shifts.
- 14. Candidates wishing to submit theses for the M.A. and M.Sc. degrees can do so only after the completion of four full Academic terms or two calendar years from the date of registration.
- 15. Students who have not graduated from one of the Bombay Colleges and who intend to take up Economics and Sociology or either of these subjects for their M.A. Examination shall join the University School of Economics and Sociology.
- 16. Conditions for admitting the students of the Indian Institute of Science, Bangalore to the M.Sc. Examination of the University are:—
 - (i) They (the students of the Indian Institute of Science, Bangalore) should obtain an eligibility certificate as required by the rules of the University and register themselves as postgraduate students with all the formalities.
 - (ii) In submitting their theses for the M.Sc. Examination, they should make a declaration which should be countersigned by the University Teacher under whom they have registered that the same material or material substantially the same has not been submitted and will not be submitted for any other degree or diploma or for the associateship of the Institute.
- 17. Fees for registration of postgraduate students once received will in no case be refunded.

RULES FOR THE RECOGNITION OF UNIVERSITY TEACHERS IN MEDICAL SUBJECTS.

(i) An applicant must possess a postgraduate degree or a qualification higher than a primarily registrable qualification.

(ii) Save in exceptional cases, eight years must have elapsed since the applicant's obtaining his first regis-

trable qualification.

(iii) In the case of Pathology, the applicant must be on the teaching staff of a Department of Pathology and Bacteriology and that in other cases he must be in independent charge of beds.

(iv) The applicant must confine his teaching and practice to the subject in which he seeks recognition.

Note: This rule came into operation from June 1936.

Condition to be satisfied by candidates for postgraduate degrees or diplomas in medical subjects.

Every candidate for a postgraduate degree or diploma in medical subjects shall, in order to qualify for admission to the Examination

therefor, have held an approved resident appointment for the prescribed period under a recognized University Teacher.

Save in exceptional cases the period of work done by postgraduate students in Medical subjects should be *unbroken*.

Rules for the recognition of Hospital Appointments for the purposes of Postgraduate Courses.

- (1) The supervision of postgraduate students and the housemen should be as far as possible by persons holding University or equivalent qualification.
- (2) The appointments should be held directly under a recognized University Teacher.
- (3) The holders of the appointments should be responsible for examination, administration, records and treatment of cases under the direct guidance of the physicians or surgeons to whom they are attached.

CHAPTER XXXVII.—REGULATIONS RELATING TO RESEARCH STUDENTSHIPS.

- (1) Research Studentships may be awarded annually to persons who hold either a Master's Degree or a Doctor's Degree of this University, subject to the conditions set out hereinafter.
- (2) These Research Studentships shall be held only by students working in institutions, or under the guidance of teachers attached to institutions, within the territorial limits of the jurisdiction of this University as defined in Section 4 A of the Bombay University Act IV, 1928.
- (3) The object of the Research Studentships is to enable research students to undertake research in any subject in the Faculty of Arts, Science, Technology, Law or Medicine.
- (4) The Research Student shall be required to work on a subject of research approved by the relevant University authorities.
- (5) A candidate for a Research Studentship shall send in his application in the prescribed form to the Registrar so as to reach him not later than the date to be fixed by the Syndicate in this behalf. No application received after the prescribed date will be accepted without the express sanction of the Syndicate. The application shall contain the following among other particulars:—
 - (a) The subject or matter which the applicant proposes to investigate and/or the general nature of the research he proposes to undertake;
 - (b) The place where he proposes to conduct or carry on his research;
 - (c) The person under whose guidance he proposes to carry on the research;

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(d) Whether he has received permission to conduct or carry on research in the place selected by him.

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(6) The award of the Research Studentships shall be made by the Syndicate after inviting recommendations from the relevant Boards of Studies.

(7) The stipend of a Research Student shall be Rs. 75 per month.

(8) A Research Studentship shall ordinarily be tenable for a period of two years from the date after the award on which the student commences his research work on his investigation. The Syndicate shall have discretion to continue any Research Studentship for a further period not exceeding two years, if they are satisfied that the character of the investigation or research and the ability shown by the Research Student justify such extension.

(9) A Research Student, who does not begin his work within one month from the date of the award of the Studentship, is liable to forfeit his Studentship.

(10) The student during the tenure of his Studentship shall engage diligently in his investigation. He shall submit periodical reports of the progress of his work to the Syndicate in accordance with the rules framed by the Syndicate from time to time. If the Syndicate are not satisfied with the progress of the investigation, they shall be at liberty to cancel the Studentship, or withhold the payment of any stipend or stipends.

(11) Every Research Student shall enter into an agreement with the University, on terms to be settled by the Syndicate, to engage diligently in research work during the tenure of his Studentship, and to refund to the University the stipends drawn by him if he resigns his Studentship before the expiry of his tenure, or if he forfeits the Studentship for misconduct or for unsatisfactory progress. The Syndicate may discharge a student from his obligation to refund the stipends drawn by him if they are satisfied that he is compelled to resign the Studentship before the expiry of its tenure owing to circumstances beyond his control.

(12) A Research Student shall not be permitted either to take out a patent or to publish his research, except with the previous permission of the Syndicate.

(13) Each Research Student shall, at the expiry of his Student-ship, submit four printed or typed copies of a paper embodying the results and giving an account of his investigations to the Syndicate. Nothing herein contained shall be deemed to prevent him from submitting to the Syndicate at any date prior to the expiry of his Studentship the results of his completed research.

(14) The student shall not during the tenure of his Studentship accept any other work or employment.

(15) If the results of the research work are considered to be of sufficient merit to deserve publication, the Syndicate may make arrangements for the publication thereof either by the University itself or by making a grant to the Research Student, or by publishing the results in the University Journal.

CHAPTER XXXVIII.—RULES MADE BY THE BOARD OF SPORTS.

Local Committees of the Board of Sports.

[Under O. 24 (i).]

- 1. Every Local Committee shall have a President, a Secretary and a Treasurer.
- 2. Every Local Committee shall appoint an auditor, who shall not be a member of the Local Committee.
- 3. The quorum for a meeting of a Local Committee shall be half the number, fractions being omitted.

General Rules framed under 0. 20 (ii) and 0. 24 (iii).

(University and Inter-Collegiate Competitions.)

- 1. All competitions shall be open to bona fide matriculate students of a college or an institution affiliated to the University of Bombay reading for University courses whose names are on the register of the college or institution during the term in which the competition is held, provided that no such students shall be eligible to take part in any of the competitions if they fail to pass a University Examination for two years in succession or have completed eight years after passing the Matriculation Examination at the time or on the day the competition is held, except that in the case of Medical, Law, Engineering, and Secondary Training College students the period shall be ten years, after passing the Matriculation Examination.
 - 2. No student of a college or institution affiliated to the University which does not pay the contribution that may be fixed by the Board of Sports or by the Local Committee concerned, from time to time, shall be eligible to take part in any of the competitions.
 - 3. When the name of a student is on the register of more than one college, he shall not, during the course of one academic year, represent more than one college in any University or Inter-collegiate contests and he shall elect the college which he will represent during the year.
 - 4. All competitions shall be held in the month or season in which the authorities concerned deem most convenient.
 - 5. The fee for entering a competition to be paid by a team or an individual shall be fixed by the authority appointed to conduct the competition.
 - 6. The details of a competition shall be settled by the authority entrusted with the conduct of the competition.

- 7. An appeal shall lie from the decision of a Local Committee to the Board of Sports. The decision of the Board of Sports shall be final and binding on the parties concerned.
- 8. The trophies shall be sent to the Principals of the winning Colleges who shall acknowledge receipt and shall be responsible for their safe custody and return when called for.

Rules of the Northcote Shield Cricket Competition.

[Framed Under Ordinance 20 (ii).]

- 1. The Shield cannot become the property of any College however often it may be won by the same College.
- 2. The Competition shall be open to all the Colleges affiliated to the University of Bombay.
- 3. No team against which an objection has been lodged will be allowed to compete till approved by the Local Committee concerned.
- 4. For the Competition, the Colleges shall be divided into the following three groups:—

Group A, consisting of all the Colleges in the Konkan Group;

Group B, consisting of all the Colleges in the Deccan and Karnatak Groups;

Group C, consisting of all the Colleges in the Gujarat and Sind Groups.

- 5. The Colleges in Groups A, B and C shall compete for the shield every third year in the order mentioned, commencing with the Colleges in Group A in the year 1934.
 - 6. (a) The Bombay Local Committee of the University Board of Sports shall have power to decide all matters connected with Shield matches between the Colleges in the Group A.

(b) The Poona and Karnatak Cum Southern Mahratta Country Local Committees of the University Board of Sports shall have power jointly to decide all matters connected with Shield matches between the Colleges in Group B

(c) The Gujarat Cum Kathiawar and Sind Local Committees of the University Board of Sports shall have power jointly to decide all matters connected with Shield matches between the Colleges in Group C.

- 7. Subject to an appeal to the University Board of Sports, the decisions of the Committees referred to in Rule 6 (a), (b) and (c) shall be binding on the Colleges concerned.
 - 8. (a) In Group A, Colleges shall play according to lots drawn by the Bombay Local Committee of the University Board of Sports.

(b) In Group B, there shall be two sections:—
Section I, consisting of all the Colleges in Poona;

Section II, consisting of all the Colleges in the Southern Mahratta Country.

In Section I, the Colleges shall play according to lots drawn by the Poona Local Committee;

In Section II, the Colleges shall play according to lots drawn by the Karnatak Cum Southern Mahratta Country Local Committee.

The winner in Section I, shall play with the winner in Section II, on a ground to be determined by the Presidents of the two Local Committees concerned.

(c) In Group C, there shall be two sections:—

Section I consisting of all the Colleges in the Gujarat Group;

Section II consisting of all the Colleges in the Sind Group.

In Section I, the Colleges shall play according to lots drawn by the Gujarat *Cum* Kathiawar Local Committee. In Section II, the Colleges shall play according to lots drawn by the Sind Local Committee.

The winner in Section I, shall play with the winner in Section II, on a ground to be determined by the Presidents of the two Local Committees concerned.

- 9. If any one of the competing Colleges does not play, its opponent shall be declared the winner.
- 10. No match except the final shall last for more than three days; and the final shall not last for more than four days; If any match is not finished within the prescribed days, the result shall be decided on the first innings. Provided that if each side has not played one complete innings, the match shall be continued till each side has played one complete innings.
- 11. When the time and place of a match have been once fixed, a postponement for reasons other than those defined in the M. C. C. Rules shall be made only with the approval of the Committee concerned.
- 12. In Groups A and B, matches shall be played on grass wickets, unless both sides agree otherwise. In Group C, matches shall be played on matting, unless both sides agree otherwise.
- 13. Except in so far as is laid down in these Rules, all matches shall be played in accordance with the M. C. C. Rules.
- 14. The University shall arrange to collect the shield from the previous winner and present it to the winning College.

Rules of University Athletic Sports.

1. The Local Committee of the contre in which the Sports are to be held shall make all the necessary arrangements in connection with the Sports.

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2. Items to be competed for in any particular year shall be decided by the Board of Sports. The following items shall ordinarily be competed for, but other items may be added:—

1. Pole Vault.

2. 200 Metres run.

3. 400 Metres run.

4. Putting the shot (16 lbs).

5. 1600 Metres Medley Kelay (200+400+800+200).

6. 100 Metres run.

7. Running High Jump.

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- 8. 1500 Metres run.
- 9. 120 yds. High Hurdles. 10. Running Broad Jump.
- 11. Hop-Step-Jump.
- 12. Wrestling.
- 3. There shall not be more than two entries for each event from each Centre, except for the team events.
- 4. Olympic Rules governing the items, equipment, measurement of track, distance and height, timing and officials, shall be followed.
- 5. Awards of Certificates and Medals shall be made as recommended by the Board of Sports.

To 1st place. University Gold Medal plus a Certificate and the right to wear University Blazar.

To 2nd place. University Silver Medal and a Certificate.

6. Scoring for College and team championships shall be made as follows:—

In the case of In the case of

Team events:—1st 16 points. Individual events:—1st 4 points.

2nd 12 ,, 2nd 3 ,,
3rd 8 ,, 3rd 2 ,,
4th 4 ,, 4th 1 ,,

Champion College:—Points for places secured by the athletes of an individual College in events other than the Relay Race, shall be added up. The College thus securing the highest number of points shall be declared the Champion College in athletics.

Team Championship:—Points for places secured by the athletes of any local committee team in all the events including Relay Race, shall be added up and the team securing highest number of points shall be declared the Team Champion.

Rules of University Tennis.

- 1. The Local Committee of the centre where the Tournament is to be held shall make all the necessary arrangement for the Tournament.
- 2. There will be one Doubles event and two Singles events in the Tournament.
- 3. Each Local Committee shall send in two entries for Singles and one entry for Doubles with the names of entrants upto a maximum of four individual players.

- 4. Each Local Committee shall nominate from amongst their competitors the Captain of the team that it sends for representing in the Tournament.
 - 5. The Tournament shall be on the Knock-out system.
- 6. The team winning two of the three matches (two Singles and one Doubles) will be declared the winner.
 - 7. (a) The make of the balls to be used in the Tournament shall be decided by the Board of Sports from time to time.
 - (b) A new set of balls will be given for the third set only if both parties agree.
- 8. The competitors are expected to be present at the specified place in time. A grace of 15 minutes shall be given in case a competitor is late, and if he is late by more than 15 minutes he is liable to be scratched.
- 9. Whenever the match is left unfinished, it shall be continued the very next day from the very point it has been stopped.
- 10. The British Lawn Tennis Association Rules shall be followed except where otherwise stated in these regulations.
- 11. Any complaints about faults of commission or omission should be brought to the notice of the Local Committee through the captain of the team only.

Rules of University Wrestling.

- 1. The rules as adopted by the Indian Army, except as otherwise mentioned herein shall be followed.
- 2. The weights accepted for purposes of University Wrestling shall be four.

Bantam Weight 123 lbs. and under; Feather Weight 134 lbs. and under; Light Weight 145 lbs. and under; Welter Weight 158 lbs. and under.

- 3. Only one competitor from each group shall be allowed to enterfor each weight class.
- 4. No competitor shall be allowed to participate in any weight class other than his own.
- 5. If any weight class has less than four entries, the competition in that weight class shall not take place and the groups shall be accordingly informed by the Organizing Committee immediately after the entries are received, so that the individuals concerned do not have to travel to the centre for nothing.
- 6. Each bout shall have three rounds of 5 minutes each. Each round shall be decided on by fall, and if no fall then by points. A

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competitor having won two rounds out of three shall be declared the winner.

- 7. The competition shall be on the Knock-out basis; but, wrestlers from any one team shall not meet each other except in the finals.
- 8. In the final match the Championship shall be decided by the best of three falls.
 - 9. Points shall be awarded as follows :-

Winners in Finals: 4 points. Losers in Finals: 3 points.

- 10. Awards. Gold Medal, Certificate, and right to wear University Blazer, will be awarded to winners in Finals and Silver Medal and Certificate to losers in Finals.
- 11. Judges. The Judges shall, as far as possible, be secured from among the Indian Army Officers.

CHAPTER XXXIX.—TRAVELLING ALLOWANCE.

0. 287.

Travelling allowance for attending meetings called by the Registrar for the transaction of business connected with the University, whether in Bombay or elsewhere, and for other University business, which requires Fellows and persons who are not Fellows of the University to travel from one place to another, by direction of the University, will be paid in accordance with the following rules:—

- (1) A Fellow, other than the Vice-Chancellor, residing within the limits of the Province, who attends a meeting or meetings or travels as described above, will be paid (a) one first class fare for travelling from his registered address to Bombay and back by the cheapest railway route, if he signs a declaration to the effect that he has travelled first class, or (b) 1½ second class fare each way from his registered address to Bombay and back by the cheapest railway route, if he signs a declaration to the effect that he has travelled second class. If the meeting or meetings are held or the attendance is required at any place other than Bombay, the fare shall be paid for travelling from the registered address of the Fellow to such place and back.
- (2) Travelling allowance at the same rate as that paid to Fellows shall be paid to persons who are not Fellows of the University, but who serve on University Committees, or who are delegated by the University to attend conferences, meetings and the like.
- (3) Wherever concession fares are available in any of the above cases, the travelling allowance for the journey to Bombay and back shall be paid at concession rates, but the extra single fare in the case of those travelling second class shall be paid at the ordinary rate.

- (4) For road journeys, members of the Senate or others travelling by road on University business will be paid at the rate of six annas per mile.
- (5) When the Vice-Chancellor travels on University business, he shall be paid 1½ first class fare from his registered address to the place or places to which he travels and back by the *Cheapest Route*. Save for the rate at which the Vice-Chancellor is to be paid his travelling allowance, all the rules relating to the travelling and halting allowances shall be applicable to him in the same way as to the other Fellows.
- (6) Where a person travels by motor car, aeroplane or any other means of transport, although there is rail-road communication, on his making a declaration to the effect that he has travelled by motor car, aeroplane or otherwise, as the case may be he shall be entitled to claim travelling allowance at the rate of a single first class fare each way by the cheapest railway route.
- In addition to the travelling allowance, Fellows and persons who are not Fellows of the University will be entitled to receive a halting allowance of Rs. 6 for each day of attending one or more meetings, or for each day spent at a place outside their headquarters on University business: Provided, however, that where the total distance travelled by such person in a single journey is over 400 miles, they shall be paid Rs. 12 instead of Rs. 6 as the halting allowance for the first day. Halting allowance may be given for a day on which there is no meeting on the day before and on the day after both of which the Fellow or other person attends.
- 0. 289. When a person resides beyond the limits of the Bombay Presidency, the journey will be counted as commencing from or ending at the first station at which he enters or leaves the Bombay Presidency.

[Explanation.

"For the purposes of this Ordinance, the expression "Bombay Presidency" shall mean the area within the territorial limits of the jurisdiction of the University of Bombay as defined in Section 4 (a) of the Bombay University Act of 1928."

- 0. 290. Notwithstanding anything contained in the foregoing Ordinances, the Syndicate may allow special halting allowances or pay a lump sum to cover both travelling and halting allowances on any occasion.
- **0. 290A.** The Syndicate may by a special resolution passed at the time of making their appointment, agree to pay travelling expenses to delegates of the University who travel on University business from one place to another in the British Isles or on the Continent of Europe.
- Nothing in the above Ordinances shall apply to persons appointed to examine at University Examinations, or persons appointed to deliver lectures under the postgraduate scheme.

Chap. XL7

ADDENDA AND CORRIGENDA

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CHAPTER XL.—ADDENDA AND CORRIGENDA.

(i) STATUTE.

Page 25.—Add the following new Statute as Statute 8A:—

S. 8A.

When a motion which has been moved by a member of the Senate, is referred by the Senate to the Syndicate for report and the report of the Syndicate thereon comes before a subsequent meeting of the Senate for consideration, the report of the Syndicate shall take the place of the original motion, and its adoption shall be moved as a motion recommended by the Syndicate. Notwithstanding anything contained in Statute 20, the mover of the original motion or any other member may move an amendment that the report be recorded and that the original motion be accepted.

(ii) ORDINANCES.

Page 99.—Insert the following in the relevant place in Ordinance 149.

Medicine.

1st M.B.,B.S... Twice... Bombay... Second Monday... 3 weeks... 30 in April and before October the examination.

2nd M.B.,B.S... Twice... Bombay... Saturday pre-... do. ... 15 ceding Second Monday in April and October.

3rd M.B.,B.S... Twice... Bombay... Second Monday... do. ... 45 in April and October.

(The amendment will come into operation from January 1940.)

Page 100.—In Ordinance 153, Add (1) the following words between the words "Bachelor of Science" and "Master of Science (by papers)":

"Master of Science (by papers in Mathematics)".—In two classes and Pass;

and (2) the following words after the words "Master of Science (by papers)" occurring in the Ordinance:

"in subjects other than Mathematics."

Page 105.—For Ordinances 157J and 158, substitute the following:—

0. 157J.

An ex-student of a school which is not now on the University Register of recognized schools or which is not now in existence, shall be sent up as such for the Examination by the head of any recognized school, provided he has not joined a school during the school year

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of his application for admission to the Matriculation Examination. The head of a school whom such an ex-student approaches with a request for forwarding his application and the Examination fee to the University, shall not charge any fee other than the fee prescribed in O. 157 I viz., Re. 1.

0.	158.	Candidates	will be examined in the following five heads:—
		I.—General	English, without texts One Paper.
		II.—(a) (i)	One of the Modern Indian languages, namely, Marathi, Gujarati, Kannada, Sindhi, Urdu and Hindi, with texts One Paper.
			An additional paper in English, with texts One Paper.
			and
			One of the Classical Languages, namely, Sanskrit, Pali, Ardha-Magadhi, Avesta-Pahlavi, Arabic, Persian, Latin, Greek and Hebrew, with texts One Paper.
		(ii)	One of the Modern European Languages, namely French, German, Portuguese, Spanish and Italian, with texts One Paper.
		III.—History	10
			1: 2 12 2
	*	Geometr	ry only Two Papers.
		(2) Ph (3) Bo	neral Science, or
		(4) Do	omestic Science, or One Paper.

Each paper shall be of three hours' duration and shall carry 100 marks.

Physiology and Hygiene

A candidate shall not be permitted to appear in Head V unless he produces a certificate from the Head of a Recognized High School showing that he has carried out satisfactorily the practical course prescribed therein.

The marks obtained by a candidate in the two languages offered by him under Head II, and the marks obtained by a candidate in Algebra and Geometry under Head IV will be added together for a pass in each of those heads.

The examination in General Science and the examination in the new syllabus in Domestic Science laid down by O. 183 will be held in the year 1939 for the first time. The examination in Spanish and Italian will be held in 1943 for the first time.

Chap. XL7

ADDENDA AND CORRIGENDA

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0. 164.

Page 107-(i) For Ordinance 164, substitute the following :-

It shall be competent to the Syndicate to frame rules from time to time for the condonation of deficiencies in the marks obtained by candidates in the several heads of passing at the Matriculation Examination and to declare such candidates successful.

(ii) Delete Ordinance 165.

Page 109: - For Ordinance 173, substitute the following: -

0. 173.

Sanskrit, Pali and Ardha-Magadhi.

One Paper—(Three Hours)—100 Marks.

1. Translation of unseen passages from and into Sanskrit, Pali or Ardha-Magadhi... 35 marks.

(20 marks for translation from Sanskrit, Pali, Ardha-Magadhi into English or any of the approved Modern Indian Languages, plus 15 marks for translation from English into Sanskrit, Pali or Ardha-Magadhi.)

An easy narrative passage shall be set for translation.

2. Translation of passages from the prescribed text with explanation of specified words and expressions occurring therein 40 marks.

The prescribed texts (Prose and Poetry) shall comprise 400 lines of easy poetry selected from classical writers, and 25 pages (of demy size) of simple narrative prose.

- 3. The study of Pali and Ardha-Magadhi should begin at the High School on the basis of Sanskrit. The basis should consist of general knowledge of Sanskrit Grammar, as embodied in the First Book and the first twelve lessons of the Second Book of Dr. Bhandarkar. Thus, the fourth and fifth standards of the High School should be taken up by Sanskrit studies; based on this knowledge of Declension and Conjugation, the Pali and Ardha-Magadhi studies are to start from the sixth standard onwards, and Pali and Ardha-Magadhi grammar and language should be given due attention during the last two years of study as well as at the Matriculation Examination.
- 4. Questions on Grammar arising out of the texts:—(compounds, recognition of forms, etc.) ... 25 marks.

Page III: -For Ordinance 177, substitute the following:-

0. 177.

French, German, Portuguese, Spanish and Italian.

One Paper—(Three Hours)—100 marks.

The paper should be divided into two parts, carrying equal marks, as below:—

(a) Translation of passages from prescribed text which should comprise not more than 100 pages of prose and 50 pages of poetry, carrying 40 marks and questions on Grammar arising therefrom, carrying 10 marks;

(b) Translation of unseen passages from French, German, Portuguese Spanish or Italian into English, carrying 25 marks and vice versa 25 marks.

Pages 142 and 147.—For Ordinance 198, substitute the following:—

0. 198.

No candidate will be admitted to this examination unless after obtaining a certificate from the Principal of an Arts College showing that he has satisfactorily carried out the work appointed by the University for the first two terms in Arts, he shall have kept two terms at a College or Institution recognized in Arts and unless he produces satisfactory testimonials in the prescribed form that he has satisfactorily gone through the course of physical training prescribed by the Syndicate from time to time, unless exempted on the ground that he is medically unfit to undergo such exercise, or that he is a member of the University Training Corps or that he has been regularly taking part as a member of the College Team in the recognized fixtures of the major games.

In order to go through the course of physical training satisfactorily the student shall have attended the physical training class of his College for at least three-fourths of the possible number of periods.

Page 147.—Add the following as Transitory Ordinance 199A relating to the Intermediate Arts & Science Examinations:—

0. 199A. Transitory.

Notwithstanding anything contained in the Ordinances relating to the Intermediate Arts and the Intermediate Science Examinations, a candidate who has been permitted by his Principal to enter on a course for the Intermediate Examination in Science will be permitted at his option to enter on a course for the Intermediate Examination in Arts, provided that he satisfies the Principal at an examination to be held before the first Monday in July, in a Classical or a Modern European Language. Such a candidate shall at his risk be permitted provisionally to attend the courses of instruction for the Intermediate Arts Examination from the 20th June, 1939.

Page 152.—Add the following as Transitory Ordinance 199B, relating to the Intermediate Arts & Science Examinations:—

0. 199B.

A candidate who has earned exemptions in all subjects but one at the Intermediate Arts or Science Examination under the old regulations, shall be required to appear only in the subject in which he has failed. For the purpose of the application of this rule, the subjects of the examinations under the new regulations shall be deemed equivalent to the corresponding subjects under the old regulations, and "Economics and Civics" shall be deemed equivalent to "Indian History and Administration.

Page 211—For Ordinance 205A, substitute the following:—

0 205A.

During the first year there shall be no University examination for a candidate proceeding to a degree in Commerce. Such candidate will be permitted at the end of the first year to enter on a course for the Intermediate Examination in Commerce, provided that he produces a certificate from the Principal of a Commerce College showing that he has kept two terms at a College affiliated to the University and has satisfactorily carried out the work appointed by the University for the first two terms in Commerce and that he has satisfactorily gone through the course of physical training prescribed by the Syndicate from time to time, unless exempted on the ground that he is medically unfit to undergo such exercise, or that he is a member of the University Training Corps or that he has been regularly taking part as a member of the College Team in the recognised fixtures of the matches of the major games.

In order to go through the course of physical training satisfactorily, the student shall have attended the physical training class of his College for at least three-fourths of the possible number of periods.

Page 218.—Add the following as Transitory Ordinance 206B relating to the Intermediate Commerce Examination:—

0. 206B.*
(Transitory.)

Notwithstanding anything contained in the above Ordinance, a candidate who has obtained a certificate from the Principal of a College affiliated to this University showing that he has satisfactorily carried out the work appointed by the University for the first two terms in Arts before the Bifurcation Scheme came into force, shall be permitted to join the Intermediate Commerce Course; provided, however, that this concession shall continue in force for a period of two years with effect from the 20th June 1938.

Page 238-For Ordinance 215M, substitute the following:-

0. 215M.

The thesis and publications, if any, forwarded by the candidate, shall be referred by the Syndicate, on the recommendation of the Academic Council and the relevant Board of Studies, to one referee or more than one referee where the special circumstances of the case require the appointment of more than one referee on account of the subjects-matter of the thesis or otherwise. Such referee or referees shall not be persons from whom the candidate has received guidance, and they shall report on the work submitted for the degree after consulting the University Teacher under whom the candidate has received guidance.

Page 247.—For Ordinance 217, substitute the following:—

0. 217.

No Candidate will be admitted to this examination unless he shall have, after obtaining a certificate from the Principal of a College affiliated to this University showing that he has satisfactorily carried out the work appointed by the University for the first two terms in Science, kept two terms at a College affiliated to the University for the purposes of the Intermediate Examination in Science and unless he produces satisfactory testimonials in the prescribed form, that he has satisfactorily gone through the course of physical training prescribed by the Syndicate, from time to time, unless exempted on the ground that he is medically unfit to undergo such exercise, or that he is a member of the University Training Corps, or that he has been

^{*}For the purpose of this Ordinance, the Inter. Arts, Inter. Science and Inter. Commerce examinations of other recognized Universities or Secondary Education Boards shall be deemed as equivalent to the First Year Arts examination of this University.

regularly taking part as a member of the College Team in the recognized fixtures of the major games.

In order to go through the course of physical training satisfactorily, the student shall have attended the physical training class of his College for at least three-fourths of the possible number of periods.

Page 259.—Add the following as Ordinance 220A:—

0. 220A.

A candidate who has passed the B.A. Examination in the Groups of Physics and Chemistry or Botany and Zoology will be allowed to appear at the Intermediate Examination in Science, with exemption, at his option, from English Prose and English Composition and from Mathematics, if he has passed the Intermediate Arts Examination with that subject and from the Science Subjects in which he has passed the B.A. Examination, provided that he attends lectures and laboratory work in the remaining subject or subjects, for a period of two terms at a College affiliated for this examination. Candidates so exempted shall not be eligible for a class or a University award.

Page 273.—For Ordinance 226, substitute the following:—

0. 226.

A candidate who has passed the Examination will be permitted on the submission of a new application and the payment of a fresh fee, to appear again at the examination in a Principal subject other than the one in which he has already passed, retaining his original Subsidiary subject (in which he shall not be permitted to appear again) or taking a new Subsidiary subject, provided that he has completed the minimum attendance during two additional terms in an affiliated college at a course of instruction in the subject or subjects in which he desires to appear. A candidate appearing at the examination under this Ordinance will be eligible for a class or distinction in accordance with Regulation 104, provided, however, that he shall be entitled to a class or distinction on the basis of the total marks obtained by him in the Principal subject alone.

Page 273.—Add the following as Ordinances 226B, 226C, 226D, 226E:—

0. 226B.

A candidate who has appeared for the B.A. Examination in Physics and Chemistry, or in Botany and Zoology, and has been declared to have obtained a Pass Degree only, and who desires to appear in the same subjects at the B.Sc. Examination, shall be exempted from his Subsidiary subject at the B.Sc. Examination, provided that he has obtained 33 per cent. of the full marks in the papers and practicals separately in the subject in which he claims exemption. Such a candidate shall be eligible for a class or distinction, subject to the provisions of Regulation 104, but shall not be eligible for University prizes, scholarships or other awards.

0. 226C.

A candidate who has passed the B.A. Honours Examination in Physics and Chemistry, or in Botany and Zoology, and who desires to appear for the B.Sc. Examination in the same subjects shall be exempted from his Subsidiary subject at the B.Sc. Examination even though he may not have obtained 33 per cent. of the full marks separately in theory at the B.A. Honours Examination.

0. 226D.

A candidate who has appeared for the B.A. Honours Examination in Physics and Chemistry, or in Botany and Zoology, and has been declared to have obtained only a Pass Degree in the said subjects shall not be required to keep any further terms to enable him to appear for the B.Sc. Subsidiary Examination in any of the Science subjects taken by him for the B.A. Honours Examination.

0. 226E.

A candidate who has appeared for and passed the B.A. Pass Examination in the subjects of Physics and Chemistry, or Botany and Zoology shall be permitted to appear at the B.Sc. Examination with one of the subjects in which he has passed as a Subsidiary subject after keeping one additional term in that subject.

Page 315.—Add the following as a Transitory Ordinance 228A:—

0. 228A.*
(Transitory.)

Notwithstanding anything contained in the above Ordinance a candidate who has obtained a Certificate from the Principal of a College affiliated to this University showing that he has satisfactorily carried out the work appointed by the University for the first two terms in Arts before the Bifurcation Scheme came into force, shall be permitted to join the First year Science (Agri.) Course. Provided, however, that this concession shall continue in force for a period of three years with effect from the 20th June, 1938.

(iii) REGULATIONS.

Page 91.—Insert the following in the relevant places in Regulation 3:—

- (1) That the B.Sc. Examination of the University of Madras is recognized generally.
- (2) That the M.Sc. Examination of the University of the Panjab by papers in Physics alone is recognized as equivalent to the corresponding examination of this University.
- (3) That the B.Com. Degree of the Agra University be recognized as equivalent to the corresponding degree of this University for purposes of admission to the LL. B. course of this University.

Page 138.—In Regulation 8, at the end of the word "Portuguese' add the words "Spanish. Italian."

Page 147.—In the second foot-note, add the following:—
"6. Hindi."

Page 148.—(i) In Regulation 13, at the end of the words "Ardha-Magadhi" add the words "Spanish. Italian"

(ii) In the foot-note add the following:—"6. Hindi."

^{*}For the purpose of this Ordinance, the Inter. Arts, Inter. Science and Inter. Commerce examinations of other recognized Universities or Secondary Education Boards shall be deemed as equivalent to the First Year Arts examination of this University.

ADDENDA AND CORRIGENDA

R.

Page 152.—Add the following paragraph at the end of Transitory Regulation 17A:—

(3) Candidates who fail to pass the Intermediate Arts or Intermediate Science Examination under the Old Regulations in 1939, will not be permitted to appear for the same examination under the New Rules unless they have kept two terms in the subjects of study for which they were not exempted.

Page 204.—In Regulation 41, substitute the words "(c) Maratha Power" for the words '(c) Maratha period, (originally Marathas, Sikhs and Rajputs').

(The amended Regulation will come into operation from 1939 so that the first examination under the revised Regulation will be held in April 1941.)

Page 211.—For Regulation 46 E, substitute the following:—

The Board of studies shall suggest to the Academic Council the name of one referee who shall not be the University Professor or University Teacher to whom the thesis shall be submitted, provided, however, that more than one referee may be recommended where the special circumstances of the case require that the thesis should be referred to more than one referee owing to the subject matter of the thesis or otherwise. Such referee or referees shall not be persons from whom the candidate has received guidance and they shall, after consulting the University Professor or University Teacher who has been guiding the student, report through the Board to the Academic Council, whether they recommend that the thesis be accepted for the degree or rejected. The report of such referee or referees shall be final. If the referee or referees recommend that the thesis be accepted, the candidate shall be declared to have qualified for the degree.

Page 259.—In Regulation 85, in Clause (a), after the words "Modern Indian Language" place a 'dagger' and add a foot-note as follows:—

"The Modern Indian Languages shall mean and include the following:—

1. Marathi, 2. Gujarati, 3. Urdu, 4. Kannada, 5. Sindhi, 6. Hindi."

Page 267.—In Regulation 87 at the end of para 17 before the N.B., add the following:—

In the detection of organic compounds detection of the elements, present in the compound, by sodium test is not expected of candidates. It is sufficient if the organic compound (given for detection) is identified by a study of some of its characteristic physical and chemical properties.

Page 315 .- For Regulation 121, substitute the following :-

*R. 121.

- (1) The subject shall be divided into four main groups:
 - Group A. General Geology (one paper, carrying 75 marks)
 - Group B. Indian Geology (one paper, carrying 75 marks)
 - Group C. 1. Mineralogy (one paper, carrying 75 marks)
 - 2. Petrology (one paper, carrying 75 marks)
 - Group D. 1. Historical Geology (one paper, carrying 75 marks)
 - 2. Palaeontology (one paper, carrying 75 marks)
- (2) Groups A and B are compulsory. The candidates shall select either Group C or D in addition.

A candidate who has done research work or submitted a dissertation in either Group C or D may be exempted in one of the papers in that Group as recommended by the Professor under whom he has worked.

(a) The Professor shall submit a detailed roport on the work done by the student either by way of research or dissertation and in the subject of the paper which he will have to take in the Group concerned. This report shall be submitted to the Examiner for his guidance before drawing up the question paper and conducting practicals as provided for hereinafter.

There shall be three practical examinations (each carrying 100 marks), one on General Geology and two on the Special subjects of the Group C. or D.

(b) The practicals shall be conducted in accordance with the nature of the work done by the student as viewed from the report of the Professor, the journals of the student and his dissertation. One of these practicals shall be a *viva voce* on the work done by the student under the guidance of his Professor.

APPENDIX.

(Conditions for recognition of schools.)

Page 102.—(Vide footnote on page 88).

Add the following as Ordinance 156J:-

0. 156J.

Schools recognized by the University under S. 188 and schools seeking recognition under the said Statute shall observe the following conditions:—

1. Every school shall maintain a General Register of all pupils admitted to it from time to time in the form approved by the Syndicate. (Vide Appendix A).

^{*}The amended Regulation will come into operation from June 1939 so that the first M. Sc. examination in Geology according to the revised regulation will be held in July 1941.

- 2. No change in the dates of birth of pupils entered in the General Register except to correct a clerical error shall be made without the express permission of the Syndicate.
- 3. Every recognized school shall comply with applications for Leaving Certificates without unnecessary delay, and no fee shall be charged for the issue of the Leaving Certificate in the first instance. The Leaving Certificate shall be in the form approved by the Syndicate. (*Vide* Appendix B.)
- 4. No pupil shall be admitted to any recognised school or a school seeking recognition, without a Leaving Certificate in the prescribed form from the last recognized school attended by him. Where the pupil has not previously attended a recognized school, he shall not be admitted unless he produces a declaration in the prescribed form (Vide Appendix C) by his parent or guardian stating that the pupil has not previously attended such a school and giving the birthdate of the pupil. All such certificates and declarations shall be filed on the school records.
- 5. Except as hereinafter otherwise provided, no pupil shall be admitted to a standard higher than that to which his Leaving Certificate entitles him, or in the absence of a Leaving Certificate the standard for which the pupil is found fit by the Head of the school admitting the pupil. If in view of the exceptional circumstances, admission to a higher standard is recommended on the result of a special examination, the Head Master making such recommendation shall apply to the Syndicate specifying the grounds in support of his recommendation, and the pupil shall be admitted to the higher standard only if the Syndicate permit this to be done. This proviso shall not be applicable to pupils who have been refused promotion at the preceding annual examination of the school issuing the Leaving certificate.
- 6. A pupil who has not attended the pre-matriculation class of a recognized school shall appear and pass the annual examination of the pre-matriculation class of the school recognized by the University to which he seeks admission.
- (Note:—For the purposes of rules Nos. 4, 5 and 6 a recognized school shall also mean a school which is not recognized by the University for the purposes of presenting candidates for the Matriculation Examination but which is in the lists of schools published by the Directors of Public Instruction, of the provinces of Bombay and Sind.)
- 7. Under no circumstances shall any school promote or admit to the Matriculation class a student who has been previously detained by the preceding annual examination.

- 8. Pupils from schools in the same town shall not be admitted after the expiry of one month from the beginning of each term.
- 9. A student in the Matriculation Class may migrate from one school to another in the first month of a school year or in the month of November. Provided, however, that the migration may be permitted by the Syndicate at other times during the year—
 - (i) if the parent or guardian with whom the student has been residing is transferred to another place;
 - (ii) if a change of air for the improvement of the student's health has been recommended by a recognized Medical Practitioner;
 - (iii) for any other reason which may appear to the Syndicate to be sufficient.
- 10. Except with the permission of the Syndicate, no one who has not passed the Matriculation Examination of this University or an examination equivalent to it, shall be appointed on the staff of a school for teaching subjects other than Drawing, Drill and Music. Teachers with primary training certificates may, however, be employed.
- 11. The strength of a division shall not exceed 35 in the first three standards, 40 in the next three, i. e. standards, IV, V and VI and 50 in standard VII or the Matriculation Class, but the Syndicates may permit the above limits to be exceeded, provided that in no case shall the number exceed 60 for a division of the Matriculation Class and 45 for a division in any other standard.
- 12. The area of a class room shall be such as to allow at least an accommodation of 10 sq. ft. per pupil.
- 13. If the school is housed in a rented building, the lease shall not be as a rule, for less than two years.
- 14. The Head Master of a school recognized shall be a graduate with a degree in Teaching or with at least five years' teaching experience in a school recognized by the University or the Department, or shall have other qualifications which satisfy the Syndicate.
- 15. Every school shall submit to the Registrar, on or before the 15th August of each year a statement showing the names of all teachers on the staff, their qualifications, and salaries they receive from month to month, and mentioning all changes made in the staff during the course of the year.
 - N. B.—This Handbook contains amendments in the Act, Statutes, Ordinances and Regulations up to 30th June, 1939.

ADDENDA AND CORRIGENDA

APPENDIX A.

Form of General Register.

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APPENDIX B.

Form of Leaving Certificate.

1.	Name of pupil in full	
2.	Race and Religion	and animal
3.	Place of birth	
4.	Date, month, and year, (in words) of birth according to the Christian Era	to the first many phones.
5.	Last school attended	
6.	Date of admission	
7.	Progress	
8.	Conduct	
9.	Date of leaving the school	
10	Standard in which studying and since when	
11	. Reasons for leaving the school	•
12	Attendance (No. of days) in Matriculation Class during school year	
18	3. Remarks	

[Part II

APPENDIX C.

DECLARATION BY PARENT OR GUARDIAN UNDER CONDITION NO. 4.

То	
	The Head Master,
	School
Sir,	
	I hereby declare that my ward
	who is seeking admission to your school
has	not previously attended any recognized school and that his date of
birt	h is theday of the month
of_	of the year_

Yours faithfully,

Parent or Guardian.

A

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